A BIOLOGICAL INVENTORY AND EVALUATION OF WASAGA BEACH PROVINCIAL PARK AND ADJACENT NATURAL AREAS

SIMCOE COUNTY, ONTARIO

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BIOLOGICAL INVENTORY AND EVALUATION OF WASAGA BEACH PROVINCIAL PARK AND ADJACENT NATURAL AREAS, SIMCOE COUNTY, ONTARIO

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ABSTRACT

A detailed life science inventory of Wasaga Beach Provincial Park and areas adjacent to it, as well as the Marl Lake ANSI candidate, was undertaken during the summer and fall of 1988. These studies have built upon the investigations and conclusions of studies in the early 1970's and early 1980's.

A total of 17 different vegetation types were identified, four of which are considered to be provincially significant. Almost 700 vascular plant species were recorded from the study area, 96 of which are considered to be significant. Four of these, *Cyperus houghtonii*, *Chimaphila maculata* *Eleocharis rostellata* and *Cirsium hillii* are nationally significant. The *Chimaphila* was not observed during this study, although the site is undisturbed. The *Cyperus*, *Eleocharis* and *Cirsium* were observed, but the *Cirsium* was found to persist in small numbers.

Over 200 bird species are known from the study area, 7 of which are considered provincially significant : Least Bittern, Yellow Rail (possible sighting), Piping Plover (formerly), Black Tern, Caspian Tern, Loggerhead Shrike (formerly) and Prairie Warbler (formerly). Several of these, and a number of regionally significant plant species, have been seriously impacted by recreational development along the Nottawasaga Bay in the Park.

Successful suppression of fire in the high dunes areas has permitted advanced succession of plant communities in the most significant natural area of the park. This has resulted in reduction of population levels of some significant species and the restriction of prime habitats. It may also have exposed the conifer-dominated forests of the high dunes to the potential for an intense and damaging fire. The current low water levels in Marl Lake have reduced breeding bird populations in the short term at least and may endanger vegetation and floral values in the long term.

The high dunes and the raised beaches associated with them are provincially and perhaps nationally significant and are proposed for protection within an enlarged Nature Reserve Zone and ANSI area, including the coastal forests of Oakview Woods. An ANSI is proposed to include the exceptional fen-like marl meadows at Marl Lake, and regional ANSIs are proposed for the Jacks Lake and Jacks Lake Fen areas. Additional studies are recommended to develop strategies and operational agendas for implementing the appropriate protection measures in each of these important areas.

PREFACE

A detailed life science inventory of the Wasaga Beach Provincial Park study area, including the park itself and adjacent lands, and the nearby Marl Lake candidate ANSI, was undertaken in the summer and fall of 1988. These studies were directed by the Regional Ecologist for Central Region, in consultation with the Parks Supervisor for Huronia District and the Park Superintendent of Wasaga Beach Provincial Park. The results are intended to provide up-to-date inventory and assessment data on the significant resources of the study area and to offer management options and directions for sensitive management of these resources.

A large body of documentation existed for Wasaga Beach Provincial Park, dating back to the resource inventory conducted by D. Cuddy, B. Carlisle and R. Norman in 1972. The master planning process undertaken in 1978 by the master plan team chaired by J.A. van der Meer offered other useful insights. A great deal of botanical data were gathered in the reports of R.S.W. Bobbette, especially his 1975 floristic assessment of the park and adjacent areas. These studies formed the basis for resource inventory and evaluation in this study. Field studies were undertaken in June, July, August, September and October 1988 in order to examine, document and delineate vegetation and floral/faunal values here.

The demanding conditions of an extremely hot summer made the co-operation and assistance of park staff especially appreciated. Park Superintendent Brian Huis offered the use of a building, provided copies of a variety of important documents, maps and data bases, and extended genial and helpful discussion, advice and background information throughout the study. This positive and productive attitude was shared by his staff, including Assistant Superintendent Mark Shoreman and by Operations Technician Bob Owen and his staff. They made the work very much more pleasant and, I'm sure, more productive. Similar courtesy and co-operation was extended by Parks Supervisor John Winters in the Huronia District office in Midhurst.

A.A. Reznicek of the University of Michigan herbarium, developed his early botanical expertise in Simcoe County and continues to apply his acute observational abilities and vast botanical knowledge in the exploration of this county's flora. He was very generous in sharing his knowledge of that flora - especially his first-hand experience in the park area and at Marl Lake - at various times during this study. He also offered identification assistance for difficult specimens, literature references and directions for obtaining additional data. Former Park Naturalist Peter Van Stam of Richmond Hill, Ontario also helped by providing directions to the *Chimaphila* site - to say nothing of the important vascular plant collections preserved in the Wasaga Beach Provincial Park herbarium and the Royal Ontario Museum. J. Atkinson of Ottawa provided important distributional data on *Eleocharis rostellata* in Ontario from her unpublished records.

I was assisted in the determination of critical vascular plant vouchers by a number of specialists, including D.M. Britton, University of Guelph (ferns and fern allies), J. Semple, University of Waterloo (asters and golden-rods), J.B. Phipps, University of Western Ontario (hawthorns) and G.W. Argus, National Museum of Natural Sciences (willows). George Argus and K.M. Pryer of the National Museum of Natural Sciences' Rare and Endangered Plants of Canada Project allowed access to their important data banks on significant plant species (once again). The curators of the large herbaria at Agriculture Canada's Biosystematics Research Institute and the National Museum of Natural Sciences permitted use of the materials in their collections in their care. J.D. Lafontaine of the Biosystematics Research Institute also undertook the necessary investigations of the rare insect larvae collected during this study.

Field assistance was offered by J.L. Riley, K. Lindsay and K.L. McIntosh in the last fall trip; Regional Ecologist Riley also provided notes on his early spring survey of the south end of Marl Lake and offered important regional and local information and lists. Riley also undertook a detailed and very useful review of the draft of this report, as did C. Frankton of the Biosystematics Research Institute, Ottawa.

Daniel F. Brunton

Daniel F. Brunton,

March 1989, Ottawa

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MAP 1 : VEGETATION OF WASAGA BEACH PROVINCIAL PARK (Inside Back Cover)

MAP 2 : SIGNIFICANT FEATURES AND AREAS IN WASAGA BEACH PROVINCIAL PARK (Inside Back Cover)

CHAPTER 1 : REGIONAL BACKGROUND

This chapter provides the background to the study and puts Wasaga Beach Provincial Park and the Marl Lake ANSI into a broader geographic and ecological context. It also assists in developing an understanding of the significance of particular resources within the study area.

1) LOCATION

Wasaga Beach Provincial Park encompasses a complex of beach and dune systems on the southeast shore of Lake Huron's Nottawasaga Bay (Figure 1). The main beach area extends for approximately 14 km along the Bay in a very narrow strip, with an extensive area of increasingly large transverse and parabolic dunes separated from this by the town of Wasaga Beach (Figure 2). The park includes approximately 1320 hectares, centered on 44° 30'N latitude, 80° 01'W longitude. It is ca. 35 km westnorthwest of Barrie in the former Sunnidale , Flos and Nottawasaga Townships of Simcoe County. Marl Lake is situated on the northeast side of the park in Flos Township and is approximately 150 hectares in area.

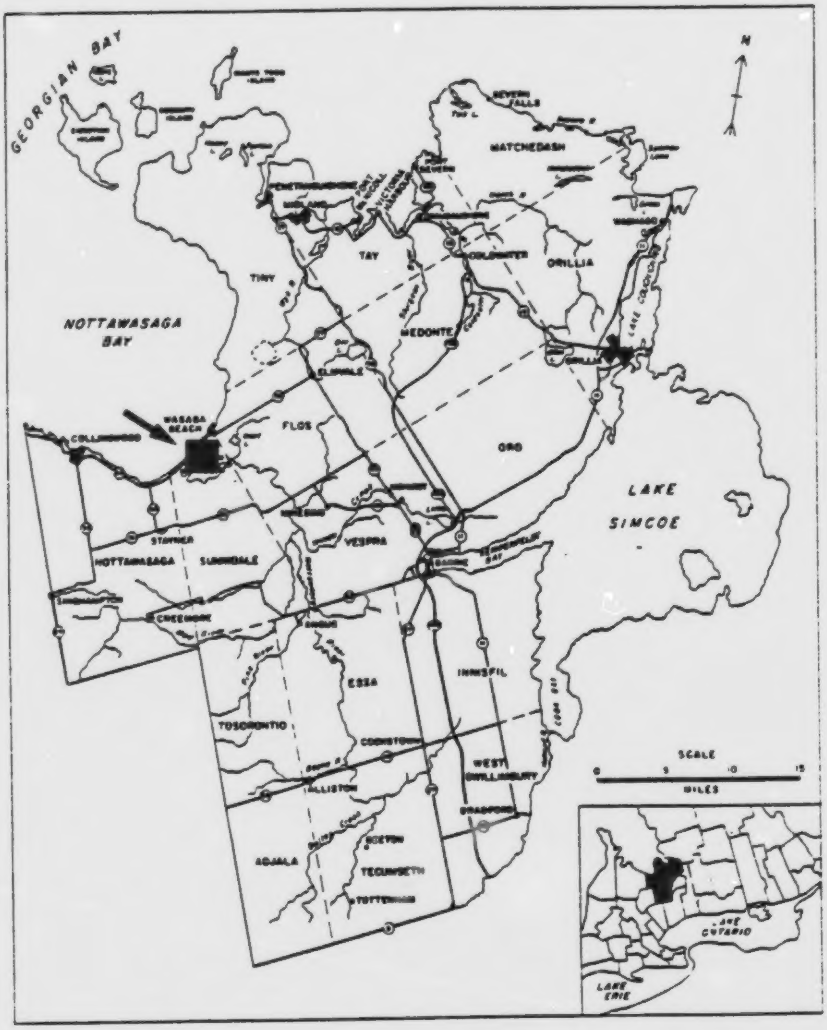
2) LAND USE

The intensive use of the beach strip for day-use swimming activity is a long-standing form of receation in the area. Back from the beach, however, the park dune lands are much less heavily used. The dune area is criss-crossed with trails (walking, skiing) that are used in a dispersed manner on a year-round basis. While illegal use of trails and fire roads in the dunes areas by all terrain vehicles is an on-going management problem, it involves relatively few individuals. Areas on the periphery of the park at Jacks Lake and along the Nottawasaga River are used by fishermen in all but the winter season.

In-holdings of private lands are found along major roadways (e.g. Powerline Road, Golf Course Road) and numerous Crown lots are scattered within the largely private holdings behind the main beach areas along Shore Lane and by New Wasaga and Allenwood Beaches. The two isolated woodlots, Oakview Woods and Ross's Woods, are both Crown-owned parts of Wasaga Beach Park.

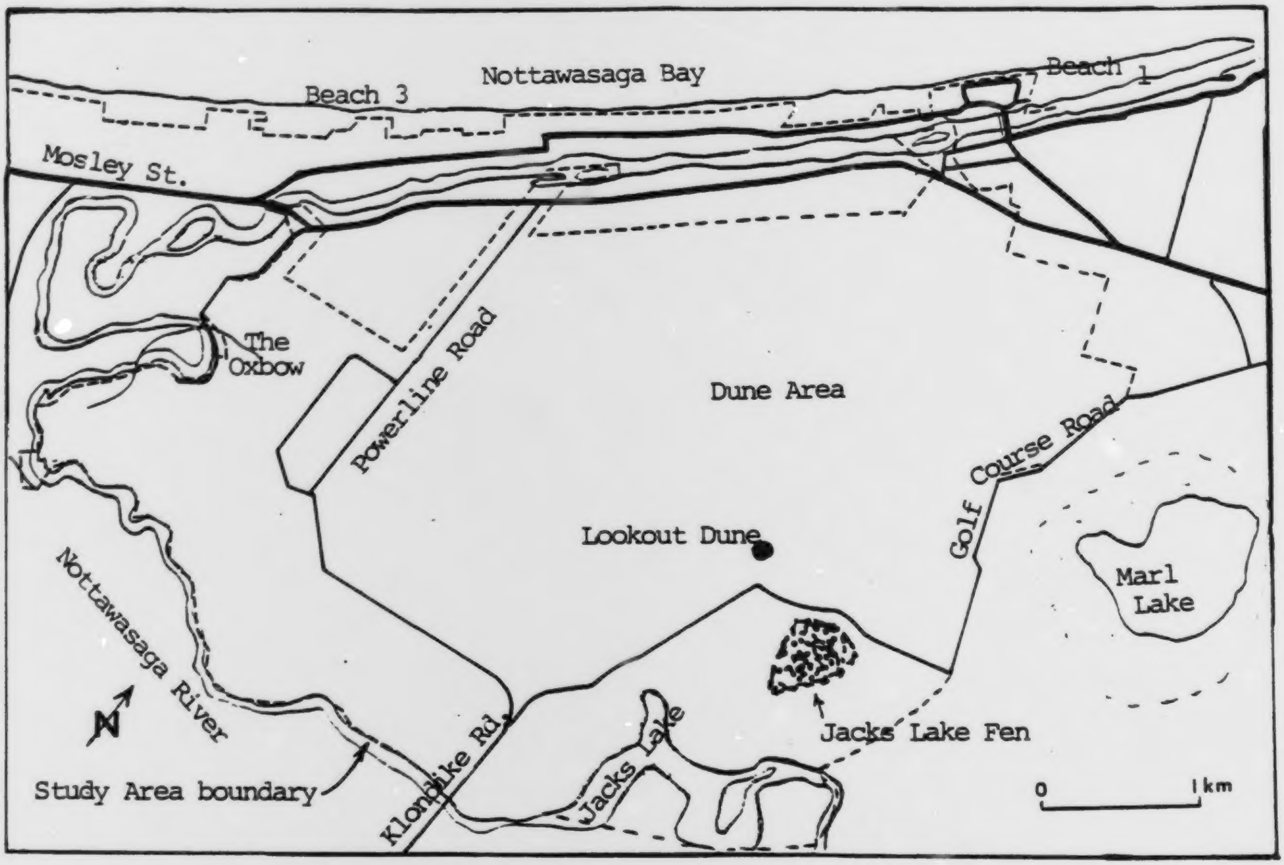
Little of the park area back from the beach has been developed for agricultural purposes in the past. While some land along the Nottawasaga River was (and is) under cultivation, no agricultural activity has been attempted in the dune lands. These upland areas have been logged repeatedly over many years, dating back to the early 19th Century. The Nottawasaga River provided an important linkage between the (relatively) developed south and the undeveloped northwest in the early years of that century and encouraged early travel through the area as well as exploitation of its valuable softwoods timber resources (White and Red Pine) (Porter 1970).

Figure 2 : Location of Wasaga Beach Provincial Park and the Marl Lake ANSI


GEORGIAN BAY
N
SEVERN FALLS
MATCHEDASH
PORT McNICOLL
VICTORIA HARBOUR
TAY
TINY
ORILLIA
NOTTAWASAGA BAY
MEDONTE
LAKE COUCHICHING
ELMVALE
WASAGA BEACH
COLLINGWOOD
FLOS
ORO
LAKE SIMCOE
STAYNER
VESPRA
NOTTAWASAGA
SUNNIDALE
BARRIE
KEMPENFELT BAY
CREEMORE
ESSA
INNISFIL
TOSORONTIO
COOKSTOWN
WEST GWILLIMBURY
ALLISTON
BRADFORD
ADJALA
BEETON
TECUMSETH
TOTTENHAM
COOK BAY
SCALE
0
5
10
15
MILES
LAKE ONTARIO
LAKE ERIE

(from Devitt 1967)

Figure 2 : Wasaga Beach Provincial Park Situation


Nottawasaga Bay
Beach 3
Beach 1
Mosley St.
The Oxbow
Powerline Road
Dune Area
Golf Course Road
Lookout Dune
Marl Lake
Nottawasaga River
N
Jacks Lake Fen
Klondike Rd.
Jacks Lake
Study Area boundary
0
1 km

(Ross's and Oakview Woods along Mosley Street, eastward)

(adapted from Anonymous 1986)

Wasaga Beach Provincial Park was established in 1958 in an attempt to manage and rationalize recreational use along the Nottawasaga Bay shore (Anonymous 1986). Although initially confined to the Nottawasaga Bay shore, it was expanded to include large areas of the high dune lands by the late 1970's. The Wasaga Beach Park Community concept was developed in 1971 to integrate the recreational and protection needs of the area, and was refined and rationalized more clearly by a later master planning program. The officially approved park master plan (Van der Meer et al. 1978) reflects the existing boundaries of the park to a large degree, although many of the recreational elements of the plan have not been implemented.

3) STUDY OBJECTIVES

The primary objectives of this study are as follows :

1) to conduct a detailed life science inventory of Wasaga Beach Provincial Park.

2) to assess the significant life science resources of Wasaga Beach Provincial Park from the perspective of their representational and/or unique contributions to the provincial park system.

3) to identify management concerns and opportunities presented by the significant life science resources of Wasaga Beach Provincial Park.

4) to document (visually, in writing and through specimens) the significant life science resources of Wasaga Beach Provincial Park.

5) to evaluate the Marl Lake candidate ANSI area in similar terms to those of Wasaga Beach Provincial Park (objectives 1 to 4, above) and identify management options and requirements suggested by these findings.

4) METHODOLOGY

Collection of the existing documentation on Wasaga Beach Provincial Park and Marl Lake was the first order of business in this study. Discussions with District, Park and Regional personnel who had direct knowledge of the park, the ANSI program and the planning situation here, were undertaken. A preliminary review of aerial photography of the study area as well as standard OMNR Site District and Site Regional background materials was initiated. Searches of basic literature sources for significant floral and faunal features were conducted. A brief reconnaissance of the study area was conducted in late June 1988.

Field work was conducted in several different time periods. This enabled the full range of seasonal variation from late spring to late fall to be investigated. The majority of field time was expended in the latter part of the summer, recognizing the late-season development of many of the important life science resources in such habitats. The field periods were : 28 June 1988; 6 July to 11 July 1988; 25 July to 26 July 1988; 29 August to 4 September 1988 and 10 October 1988. During such field sessions black and white photographs of habitats and important features were taken, as well as voucher specimens for significant plant species. The vegetation types were mapped on overlays of 1:10,000 scale stereo aerial photographs. Notes on observations and possible management considerations were also taken. Breeding bird observations, mammal sighting and other faunal records incidental to the vegetation/ floristic studies were noted.

Following field studies the voucher specimens and photographs were sorted, identified and distributed, as required. Resource specialists in a variety of fields were contacted with regard to the general Wasaga Beach Provincial Park situation and for data concerning particular significant taxa. The herbaria at the National Museum of Natural Sciences (CAN) and Agriculture Canada (DAO) were examined in order to evaluate certain species. A detailed review of the appropriate research literature was conducted at this time.

A draft report was prepared in late December 1988. This final reports was developed from that draft, incorporating the comments and concerns of several reviewers.

5) PREVIOUS STUDIES

The geology and geomorphology of Wasaga Beach Provincial Park has been examined and documented in considerable detail over the years (Carlisle et al. 1972; Martini 1974; Van der Meer et al. 1978), but the life sciences have received less concentrated study until recent times.

The first natural scientist to visit the park area was the famous explorer/naturalist Sir John Richardson who travelled the Nottawasaga River route between Lake Simcoe and Georgian Bay in April 1825 (Devitt 1967). This trip was undertaken with Sir John Franklin who was involved in his second expedition into northwestern British North America (1825-1827)(Houston 1984). There is evidence only of collections by Richardson from the Penetanguishene area, so it seems likely they did not stop for any length of time at Wasaga Beach or at other sites in Simcoe County (Devitt 1967).

The first detailed observations of the Wasaga Beach area date from the early 20th Century. Dr. Paul Harrington, a noted ornithologist, 'summered' at Wasaga Beach almost continuously from 1916 to 1966 and collected information and specimens which were deposited in the Royal Ontario Museum (Devitt 1967). Several papers on birds in the Wasaga area resulted from his observations, including a report of the first nest of Prairie Warbler to be found in Canada (Harrington 1922 and 1924) and the first list of Wasaga Beach birds (56 species)(Harrington 1916).

As access improved, more naturalists visited the park area and gathered information. While no detailed studies occurred in the early to mid 20th Century, many incidental notes and collections were assembled. The interest of E.L. Brereton until his death in 1950 and the activities of the Brereton Field Naturalists' Club after 1951, were important. So too was the interest in Simcoe County birds demonstrated by Ott Devitt, first in the 1930's . While his investigations in the Wasaga Beach area relied mostly on the efforts of others such as Harrington and F.A. Starr, the park area figured significantly in his 1943 - 1944 'Birds of Simcoe County' (Devitt 1967).

Botanical investigations remained sketchy until very recent years, despite the attendance of some very prominent botanists as early as the 1930's (e.g. Frere Marie-Victorin and Frere Rolland-Germain in August 1935 - see Oenothera oakesiana discussion). Oakview and Ross's Woods became well known to the local naturalists community for their rich orchid floras (A.A. Reznicek, pers. comm.) but this did not seem to extend to the rest of the park area to any great degree until the 1960's. A.A. Reznicek and R. Bobbette of Barrie became very interested in the flora of Simcoe County in general and of Wasaga Beach in particular and collected extensively in and about the park area in the late 1960's and throughout the 1970's. Studies associated with the management and planning of Wasaga Beach Provincial Park contributed important data too. In 1972 Donald Cuddy undertook an ecological inventory of the park area (Carlisle et al. 1972) and incorporated Bobbette and Reznicek data at that time. Richard Seely conducted vegetation studies in 1973 and collected a number of vascular plant specimens that became the foundation of a Wasaga Beach Provincial Park herbarium. This was added to extensively by interpretive staff, most particularly by Peter Van Stam in 1975.

The largest source of documentation of botanical resources is the report prepared by R. Bobbette (1975) that listed the species known to occur within the town of Wasaga Beach (some 611 taxa) and indicated their Simcoe County distribution. Bobbette also conducted several vegetation/floristic management studies for the Ministry of Natural Resources in this period (Bobbette 1984).

Mammal data are very scanty and there appears to have been little investigation in the Wasaga Beach area (cf. Peterson 1966).

For the purposes of this study, then, the studies of D. Cuddy (Carlisle et al. 1972) and A.A. Reznicek and R. Bobbette (Bobbette 1975) provide the baseline from which new investigations flow. These data are enhanced by the information contained in the Wasaga Beach Provincial Park herbarium (examined in full in 1988).

CHAPTER 2 : RESOURCE INVENTORY

This chapter describes the floristic and vegetational resources of the study area in detail. It also offers a general assessment of the faunal diversity of the park. Geological and cultural descriptions are also provided in order to put the life science resources into context.

1) GEOLOGY AND GEOMORPHOLOGY

While Wasaga Beach and much of the area surrounding it is underlain with 500,000,000 year old Ordovician limestone (Freeman 1979), this has little effect on the surficial topography or the patterns of biotic life. The bedrock is deeply buried under many meters of glacial and lacustrine deposits, known to be at least 50 m thick at the beach itself (Carlisle _et_ _al_. 1972).

The study area's landscape has evolved through a series of geomorphological stages that commenced with the decay of the Wisconsinan ice sheet from this part of Ontario about 12,000 years Before Present (B.P.)(Dyke and Prest 1986). When the ice sheet had decayed sufficiently to expose the park area the land had been depressed considerably by the weight of vast ice deposits moving slowly across it for millenia. This depression and the abundance of meltwater from the decaying glaciers resulted in a huge freshwater lake forming against the glacial margin - glacial Lake Algonquin. The lake covered the landscape for about a thousand year or so until landscape rebound and improved drainage to the south through the Mississippi River valley lowered the lake levels sufficiently to expose some land in the Wasaga area. The landscape that was exposed from about 11,000 to 9000 years B.P. was a stark, subarctic, cold area of stunted Black Spruce and Jack Pine in clumps scattered across a tundra-like lichen heath (McAndrews _et_ _al_. 1987). An increase in water levels resulting from an increased rate of ice sheet melting and blockage of the southern drainage routes led to the formation of glacial Lake Stanley-Nipissing. The lake flooded the Wasaga Beach area once more until about 8400 years B.P. About this time drainage to the east, through the Ottawa Valley, and landscape rebound again exposed parts of the Wasaga area but to a less arctic-like situation. In this part of Ontario the lichen woodland was giving way to a transitional vegetation with a more complete forest cover that included more southern elements (White Pine, Red Oak, etc.). A readvance of the Nipissing Great Lakes about 7000 years B.P. flooded most of the park area once more. The lengthy periods of inundation since glacial retreat some 5000 years earlier resulted in great depths of water-carried sand being deposited in the south end of what is now Georgian Bay. A barrier bar began to form from this material.

The first area of Wasaga Beach Park to be permanently released from the periodic inundations that had characterized this area since deglaciation was now evident (Figure 3). The barrier bar began the formation of a lagoon between the open glacial Nipissing Great Lakes and the wetland extending south then east to Lake Simcoe. About 5000 year B.P. and for a period of about a thousand years thereafter the Nipissing Great Lakes declined, enlarging the barrier bar until it cut off the eastern wetlands. The upland vegetation was dominated by a transition forest of pine, oak and maple (McAndrews et al. 1987). Dunes, created by the prevailing winds coming off the lake and across the barrier bar, began to grow along the summit of the sand ridges (Figure 4).

The development of the dune systems was enhance by a climatic warming, the Hypsithermal, that extended from about 7,000 years B.P. to about 4,000 years B.P. (McAndrews et al. 1987). This warm, dry period encouraged the spread of southern and southwestern vegetation types into Ontario. It also increased the incidence of drought and fire, two conditions that encourage blow-outs to form in dune areas. The warm, dry conditions and continuing sand deposition across the lagoon bar resulted in significant growth in the transverse dune system. Movement of sand from the lower transverse dunes resulted in formation of the higher parabolic dunes to the east.

The continuing decline of water levels from about 4,000 years B.P to about 2,500 years B.P., with the resulting exposure of more sand for dune formation, saw the dune system develop in the Park area to very much the condition we see today. The rebound of the land also meant the development of a large series of parallel ridges and hollows conforming to former shorelines of the lake. The Nottawasaga River formed in the large depression to the east and eventually cut a channel through the dunes. Lake currents formed the long spit between the last few kilometers of the river and the open lake waters, land that is highly utilized by modern visitors (Figure 5).

With the return to the cooler climate of contemporary times, a stablilization of lake levels and the firm establishment of a Great Lakes - St. Lawrence vegetation type by about 2,500 years ago, the landscape of the park area was formed in essentially the condition observed by the first European explorers who came this way (Figure 6).

This evolution of the Quaternary landscape in the Wasaga Beach area is explained in more complete detail in Carlisle et al.(1972). The details have been modified to accommodate more precise chronological and palaeobotanical information (Dyke and Prest 1986 and 1987; McAndrews et al. 1987).

The modern landscape of Wasaga Beach Provincial Park, then, is made up of several distinct units. Closest to Nottawasaga Bay is the active beach, including the spit, that runs along the bay shore for many kilometers. Inland from there (Figure 7) is a broad band of low ridge and swale features indicating post-Nipissing raised beaches. The large area of rolling, irregularly formed transverse dunes forms a large wedge inland of the raised beaches. Behind the

Figure 3 : Wasaga Beach Area ca. 7000 years B.P. (adapted from Carlisle _et_ _al_. 1972).

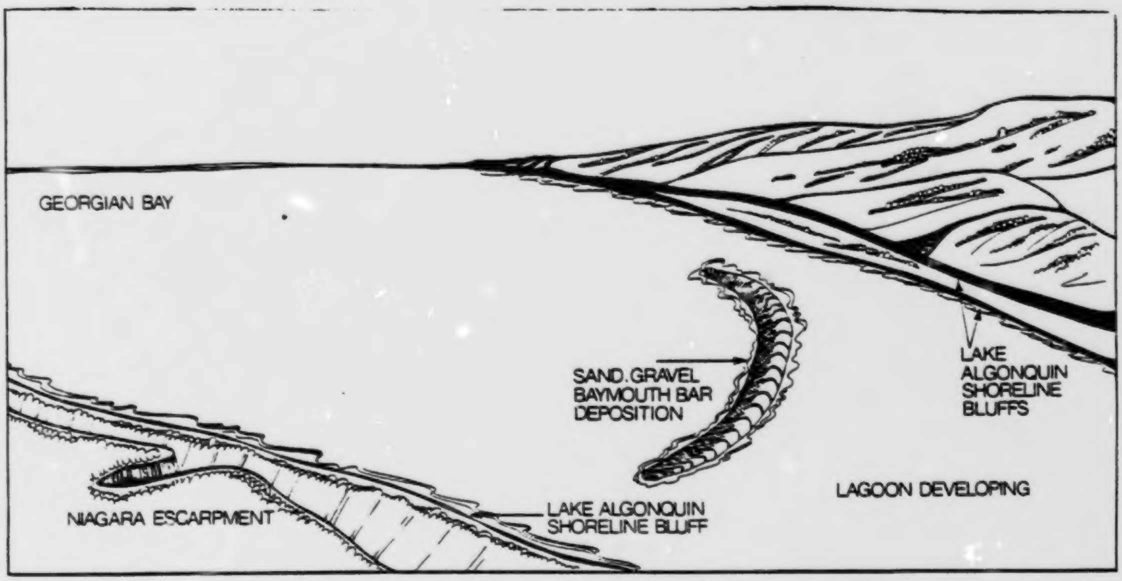

GEORGIAN BAY
SAND.GRAVEL BAYMOUTH BAR DEPOSITION
LAKE ALGONQUIN SHORELINE BLUFFS
LAGOON DEVELOPING
NIAGARA ESCARPMENT
LAKE ALGONQUIN SHORELINE BLUFF

Figure 4 : Wasaga Beach Area ca. 4500 years B.P. (adapted from Carlisle _et_ _al_. 1972)

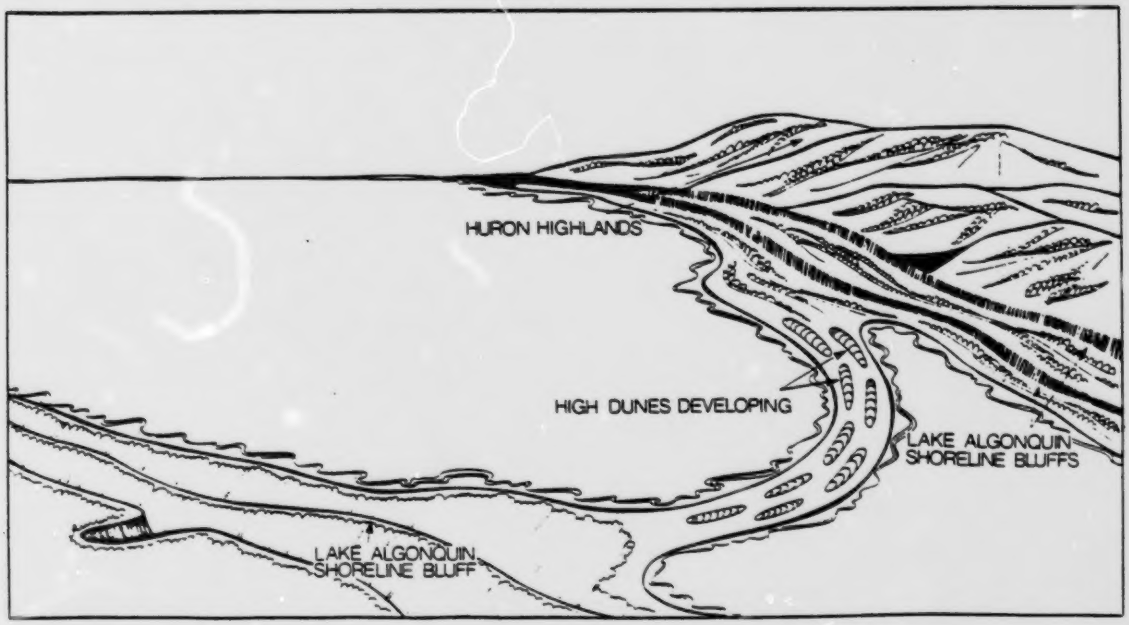

HURON HIGHLANDS
HIGH DUNES DEVELOPING
LAKE ALGONQUIN SHORELINE BLUFFS
LAKE ALGONQUIN SHORELINE BLUFF

Figure 5 : Wasaga Beach Area ca. 3000 years B.P. (adapted from Carlisle *et al*. 1972)

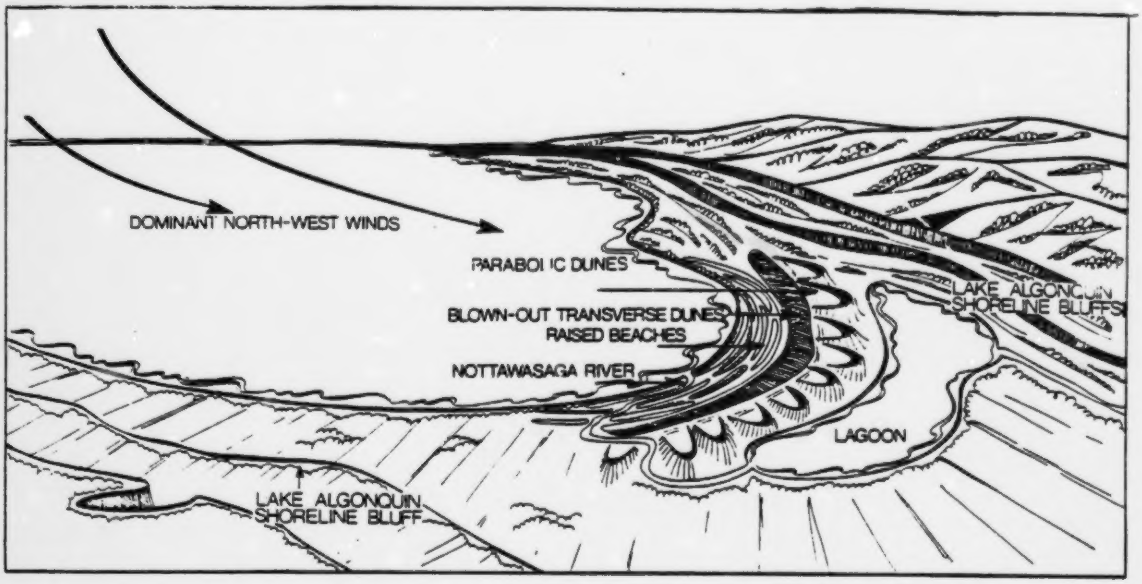

DOMINANT NORTH-WEST WINDS
PARABOLIC DUNES
BLOWN-OUT TRANSVERSE DUNES
RAISED BEACHES
NOTTAWASAGA RIVER
LAKE ALGONQUIN SHORELINE BLUFFS
LAGOON
LAKE ALGONQUIN SHORELINE BLUFF

Figure 6 : Wasaga Beach Area at present (adapted from Carlisle *et al*. 1972)

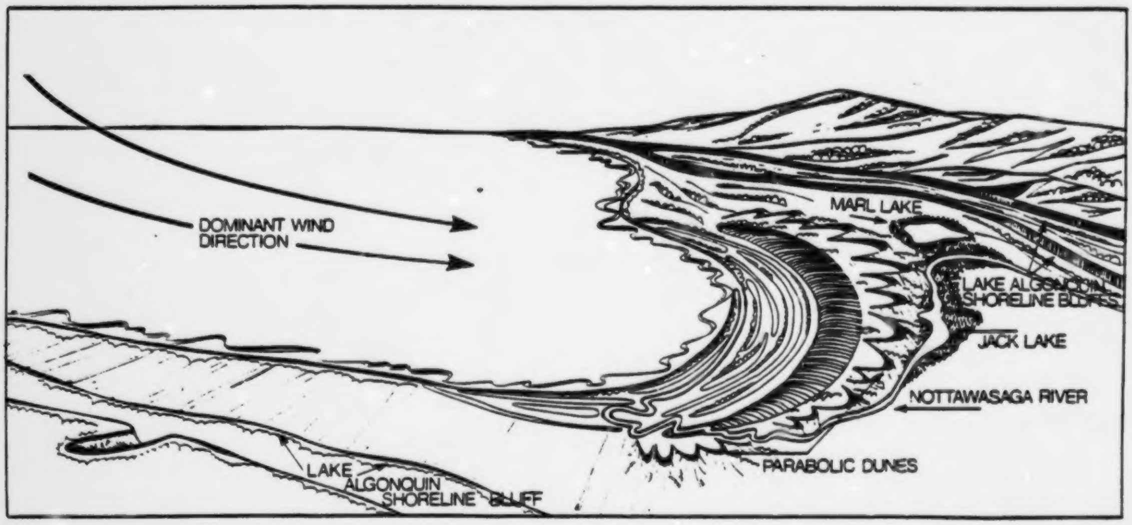
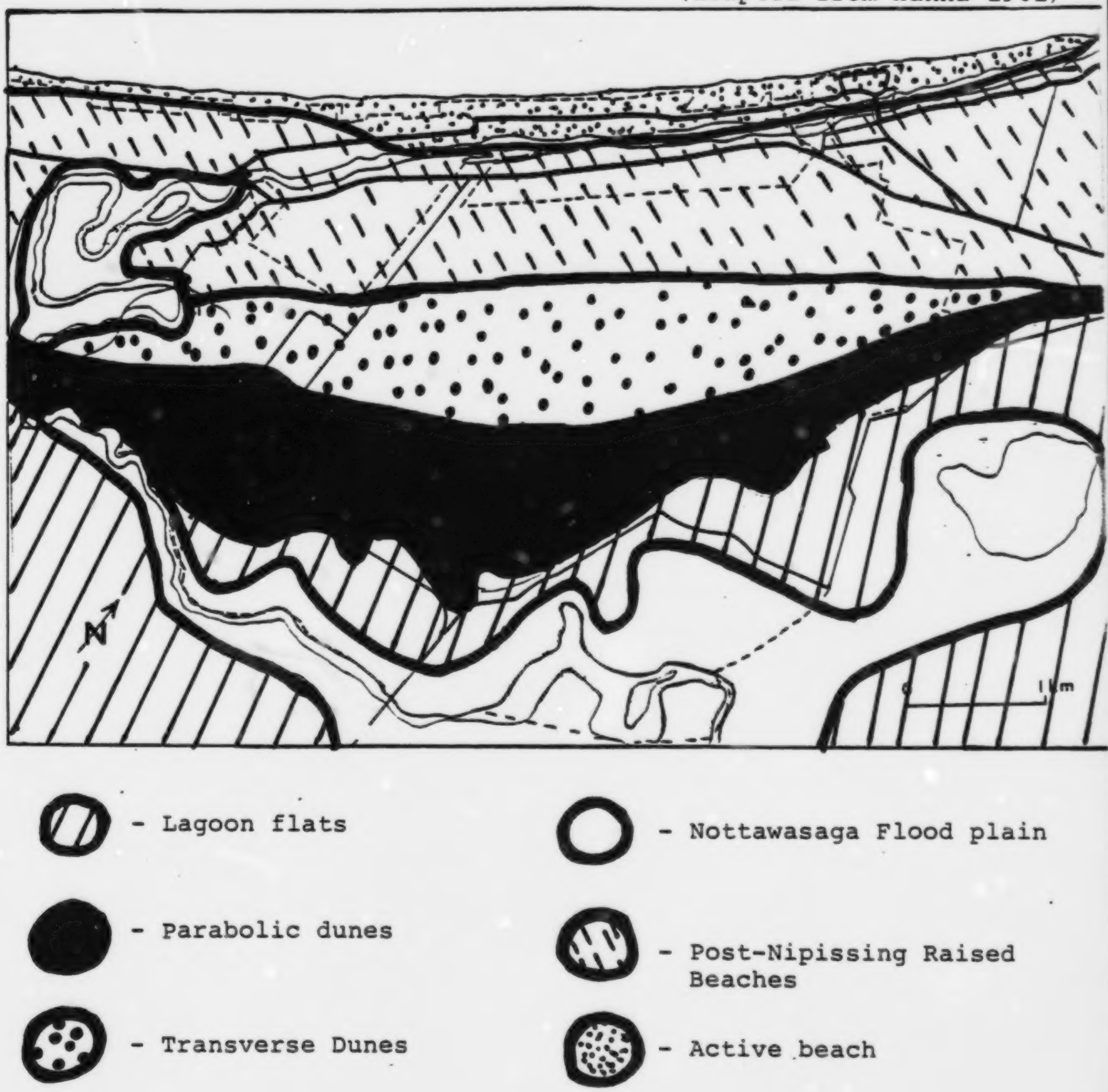

DOMINANT WIND DIRECTION
MARL LAKE
LAKE ALGONQUIN SHORELINE BLUFFS
JACK LAKE
NOTTAWASAGA RIVER
PARABOLIC DUNES
LAKE ALGONQUIN SHORELINE BLUFF

Figure 7 : Geomorphological Features in Wasaga Beach Provincial Park


(adapted from Hanna 1981)

N
0
1 km
- Lagoon flats
- Nottawasaga Flood plain
- Parabolic dunes
- Post-Nipissing Raised Beaches
- Transverse Dunes
- Active beach

transverse dune area is the field of high parabolic dunes, some rising to over 50 m above the lake level. A broad expanse of level, silty-sand lagoon flats extends inland from the precipitous eastern wall of the parabolic dune fields. Marl Lake and Jacks Lake constitute the last vestiges of the large Nipissing Great Lakes lagoon that once filled the valley. The Nottawasaga River that winds across the lagoon bottom has created an allivial flood plain along its course,even in the area where the river cuts through the dunes to the lake.

2) VEGETATION

The vegetation of Wasaga Beach Provincial Park is complex, reflecting a dramatic postglacial history and its location in a diverse and ecologically interesting region. It includes elements of riparian forest along the Nottawasaga River flood plain, young mixed forests on the ancient Nottawasaga Lagoon flats, extensive pine and oak-pine forest on the high parabolic and transverse dune systems, and a mixture of alternating wetland and ridge intolerant forest vegetation on the raised beach systems near the lakeshore. There are even small areas of prairie-like grassland vegetation in the high dunes and along the active beach, as well as desert-like barrens vegetation in the same two areas.

In his analysis of the vegetation of Wasaga Beach Provincial Park and area (Carlisle et al. 1972), D. Cuddy identified 28 types of vegetation. A number of these are essentially minor variations on a theme and, accordingly, are lumped with others in this study. While the excellent mapping and description of these units resulting from Cuddy's work has been followed closely here, the number of units has been condensed to 17 (see Map 1).

The study area is situated within the Huron-Ontario Forest District as described by Rowe (1972), a large area of the Great Lakes - St. Lawrence Forest Region extending from Manitoulin Island eastward to the Penetang Peninsula and across the northern edge of the Ordovician lowlands of southern Ontario to Kingston. The more refined concept of Hills (1959) considers this area to be a part of Site District 6-6 (Barrie) of Site Region 6. A Site Region is an area of land within which the response of the vegetation to the landform follows a consistent pattern. Each of these landform types has a characteristic plant succession. Hills (1959) describes Site Region 6 (The Simcoe - Rideau Site Region) as a gently undulating to rolling terrain of ice-laid materials deeply covering the bedrock, with local plains of lacustrine deposits and shallowly covered limestone plains. Beech, Sugar Maple and Hemlock characterize the ultimate forest type on fresh, normal sites, with oak and hickory on warmer sites. Hemlock, Cedar and Yellow Birch, with some spruce, typify wet sites.

Hills (1959) describes the Site District as being low in lime, with water-laid clay and silt and sand broken by ridges of loam and sandy loam. The Simcoe Lowlands of Chapman and Putnam (1966), including the Nottawasaga River valley as its western portion (also known as the Nottawasaga Basin) are contained within the Site District.

Hanna(1984)found about 20% of Site District 6-6 to be still in a natural or nearly natural state. These remnants were most commonly upland sand plain/till plain; kame hills; swamp; marsh; bog and lake; shoreline beach ridges and dunes; sand plain lowlands,and river valley systems.

The vegetation is described in ecological terms instead of the listing of plant association dominants. The vegetation is first divided into large categories (Upland, Lowland, Aquatic). Forest vegetation is then subdivided on the ecological basis of shade tolerance, which groups species of trees with similar successional capabilities. These are further subdivided into Vegetation Types by identifying coniferous or deciduous composition. This encompasses all of the forest vegetation variation within Ontario in easily defined and ecologically driven categories. Non-forested and aquatic vegetation is categorized by the elements identified in the analysis of a large body of vegetation association data (Brunton 1982) and with reference to Riley (1988) for a more precise description of wetland units.

This system is less complex than the Regional Site Type Matrix often employed in Ministry of Natural Resources life science studies (Beechey and Davidson 1980) and offers a clear picture of the relationships within the vegetational mosaic of a particular area. As the Site Type Matrix approach is the standard framework for Ministry of Natural Resources life sciences studies, however, representative vegetation formulae (viz, listing of the vegetation dominants and an estimate of the percentage cover achieved by each dominant) are added within the description of each Vegetation Type. The associations are displayed on a Site Type Matrix for the study area (Figure 8).

The classification of the vegetation of the Wasaga Beach Provincial Park study area includes the following Vegetation Types :

Upland Vegetation

Type 1 - Developed and/or Severely Disturbed Land

Type 2 - Conifer Plantation

Type 3 - Upland Intolerant Deciduous Forest

Type 4 - Upland Intolerant Mixed Forest

Type 5 - Upland Intolerant Coniferous Forest

Type 6 - Upland Tolerant Coniferous Forest

Type 7 - Sand Barrens

Type 8 - Upland Meadows and Dry Thickets

Figure 8 : Site Type Matrix

		ARID	VERY DRY	DRY	DRY MESIC	MESIC	WET MESIC	WET	VERY WET	SATU-RATED	OPEN WATER
COOLER	Rock										
	Sand				3a		6a,b, 6c	10b,11a 11b,c	9a,d	14a,c	15b
	Loam										
	Clay								9b		15a
	Organic									NOTE A	16b
NORMAL	Rock										
	Sand			4a,f	3a,f	3e,4e, 8c	4i, 10c 13d	9c	14b		
	Loam				3h						
	Clay						8b,10a, d,e,13a		12a,b 13g	16a	
	Organic										
WARMER	Rock										
	Sand	7a,b, 7c,d	4g,7e 8a	NOTE B	3g,4h						
	Loam										
	Clay										
	Organic										

NOTE A : 11c, d, e; 13b, c, d,e,f; 14a,b,c,d,f,g,h; 17a.

NOTE B : 3b,c,d; 4b,c,d; 5a,b.

Lowland Vegetation

Type 9 - Lowland Intolerant Deciduous Swamp Forest
Type 10 - Lowland Intolerant Mixed Swamp Forest
Type 11 - Lowland Intolerant Coniferous Swamp Forest
Type 12 - Lowland Tolerant Deciduous Swamp Forest
Type 13 - Thicket Swamp
Type 14 - Wet Meadows

Aquatic Vegetation

Type 15 - Mixed (Emergent and Floating) Marsh
Type 16 - Shallow Marsh
Type 17 - Open graminoid fen

Map 1 (inside back cover) provides a detailed delineation of these Vegetation Types within the study area.

Vegetation Type 1 : Developed and/or Severely Disturbed Land (Figures 9 and 10)

Figure 9: Type 1 - Developed and/or Severely Disturbed Land

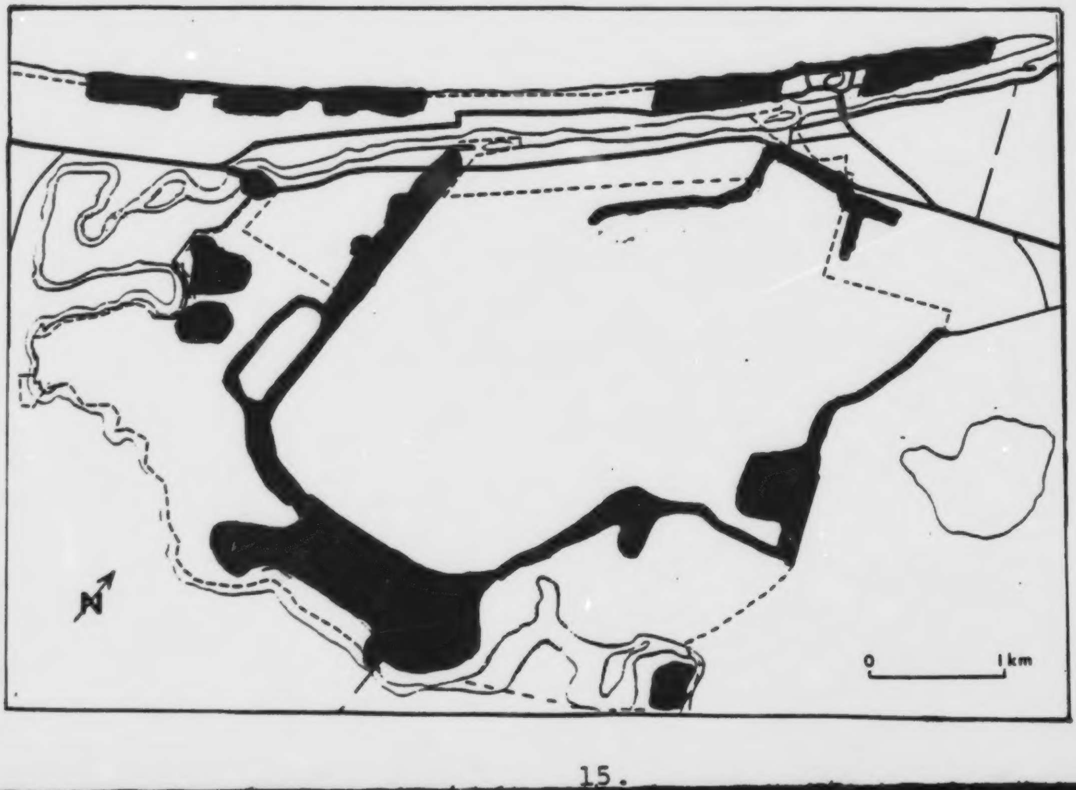
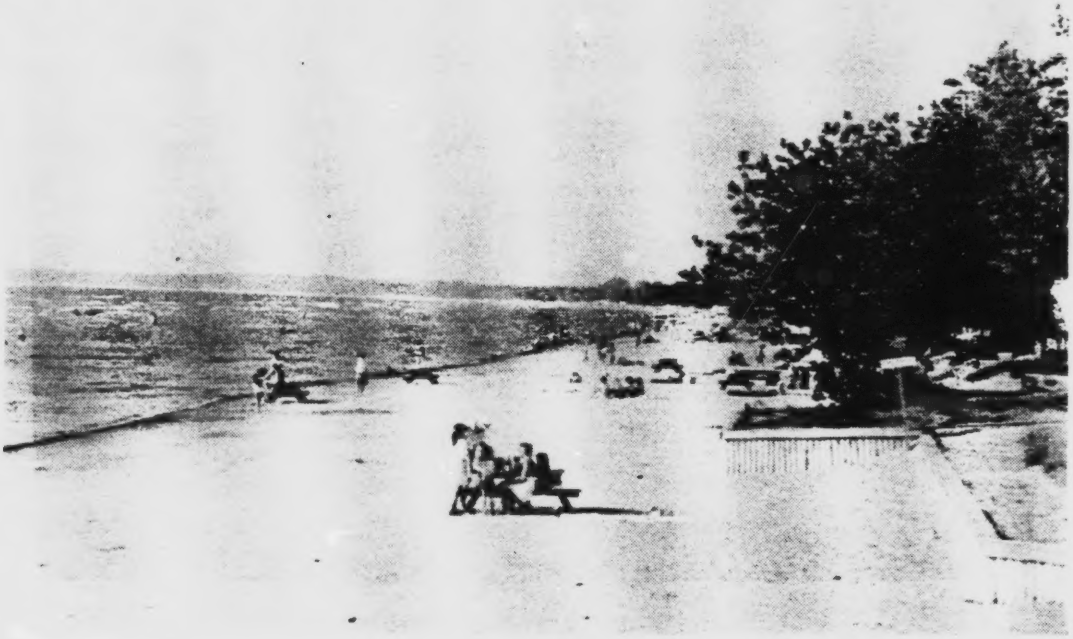


Figure 10 : Disturbed Beach Area (Beach 3) and Developed Lands by Park Office (Type 1)



Site: Various upland sites in association with facilities in open areas and along roadways, the swimming beach front as well as croplands along the Nottawasaga River plain.

Characteristics : The vegetation of this Type is primarily non-native, reflecting the destruction of the native flora in the development of artificial landscape. Typical species include :

Chrysanthemum leucanthemum
Plantago major
Ambrosia artemisiifolia
Agropyron repens
Hypericum perforatum
Oenothera parviflora
Poa annua
Taraxacum officinale
Phleum pratense
Trifolium spp.

Further Considerations : This Type has no biological significance. While some unusual plant species are found here, they are mostly alien species of little floristic importance.

Vegetation Type 2 : Conifer Plantation (Figures 11 and 12)

Site : On dry, sand sites in the parabolic dunes; on sand barrens or sand prairie areas in warmer, very dry situations.

Figure 11 : Type 2 - Conifer Plantation

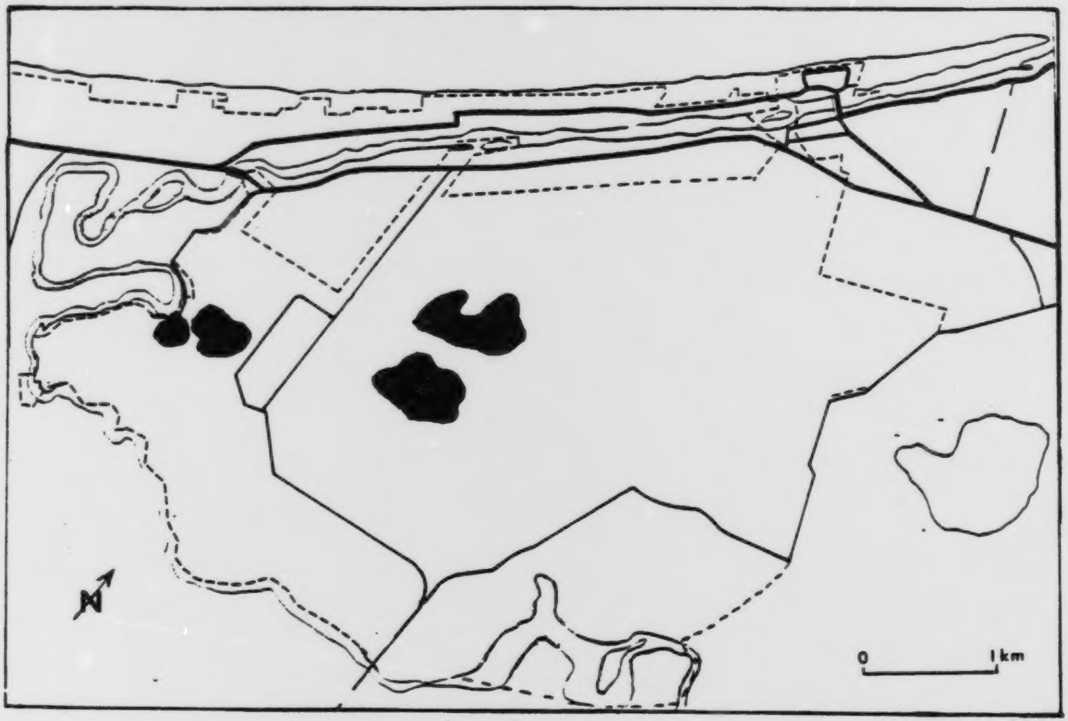
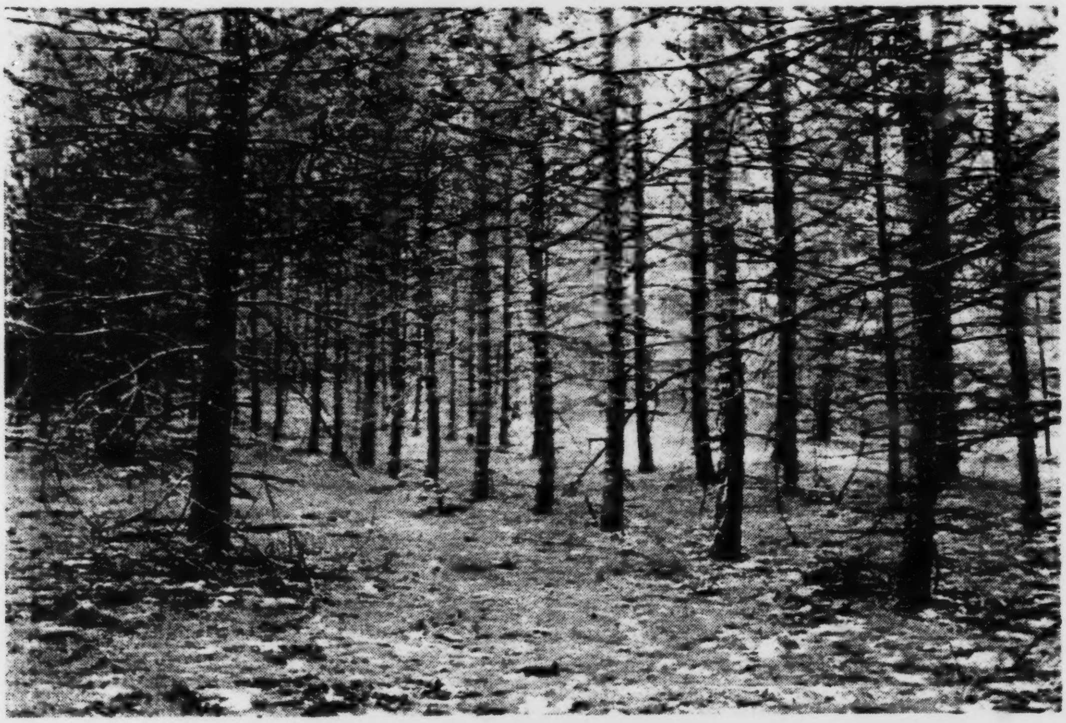


Figure 12 : Red Pine Plantation west of Powerline Road in high dunes (Type 2).



Characteristics: As noted by Cuddy (Carlisle _et al_. 1972), the plantations succeed, if at all, at the expense of native grassland and sand barren species; species diversity, both floral and faunal, is very low. The dense canopy effected by the closely placed trees excludes most ground flora, as demonstrated in Figure 12. Red, White and Jack Pine, White Spruce and Scots Pine plantations were observed.

Typical ground flora includes:

Carex pensylvanica
Pteridium aquilinum
Poa compressa
Cladina lichen

Hieracium piloselloides
Hypericum perforatum
Danthonia spicatum

Further Considerations : The areas in which these "ecological deserts" are placed were once important natural landscapes (sand barrens and sand prairies). The plantations have little or no life science significance in their own right. These areas should be rehabilitated, as recommended by Cuddy (Carlisle _et al_. 1972), Van der Meer _et al_. (1978) and Hanna (1980), by thinning and/or prescribed burning.

Vegetation Type 3 : Upland Intolerant Deciduous Forest
(Figures 13, 14 and 15)

Site: Mesic to dry sand and sandy-loam areas, mostly on the lower elevation areas of the park area are found in normal to warmer microclimates. The largest areas are located along the raised beach areas and on the down slope of the southeast edge of the dune fields.

Characteristics : Red Maple, Red Oak and White Birch dominate this Vegetation Type, with Red Oak predominating in the driest sites and Red Maple in the most mesic. Accordingly, Red Oak is most common within this Type in the high dunes. The understory vegetation is dense, especially in the low dunes and along the river plain and raised beaches, with many shrub and herbaceous species. Green Ash, White Pine, Trembling Aspen and Basswood occur in smaller numbers in various stands.

This vegetation is mostly immature, with an abundance of light reaching the ground level. The small 'sugar bush' west of Jacks Lake (Figure 15) is the closest to a tolerant deciduous forest of any stand in Wasaga Beach Park (3h, below).

The vegetation associations recorded from this Type (see Figure 8), are as follows :

3a) Red Maple^{6} - White Pine^{2} - Red Oak^{2} (low dunes)

3b) Red Oak^{5} - Red Maple^{2} - White Pine^{2} - White Birch^{1} (low dunes)

3c) Red Oak^5 - Red Maple^3 - White Pine^2
(high dunes)

3d) Red Oak^8 - Red Pine^2
(high dunes)

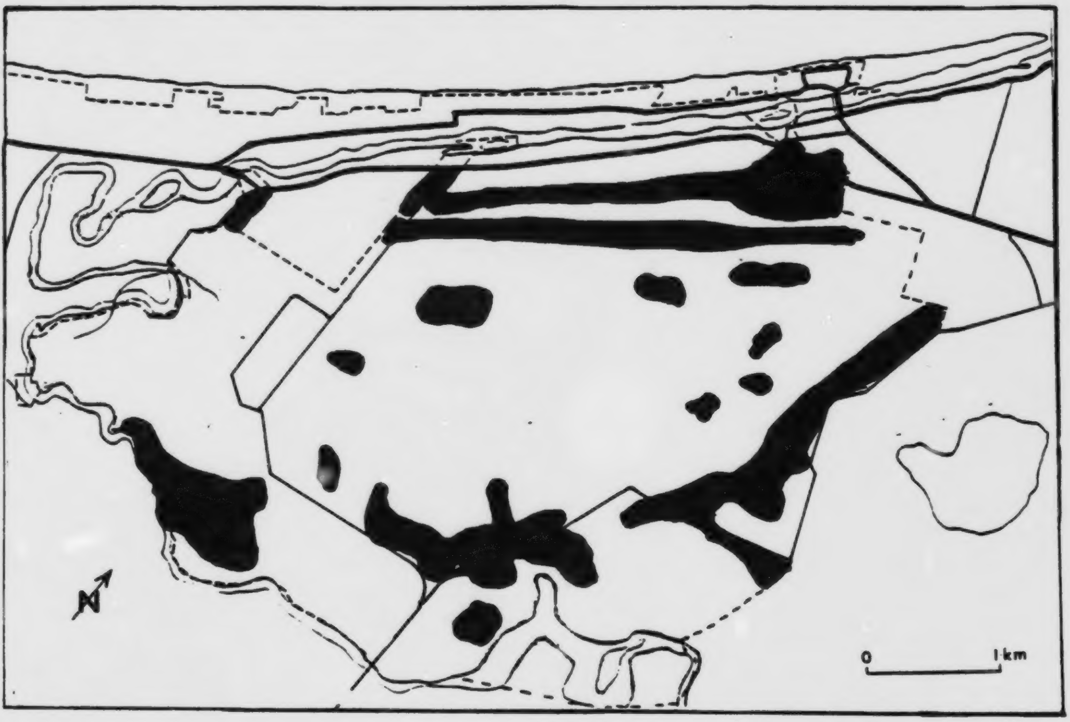
3e) Red Maple^6 - White Birch^4
(low dunes)

3f) Red Maple^5 - White Birch^2 - White Pine^2 - Green Ash^1
(low dunes near river)

3g) Red Oak^4 - Red Maple^3 - White Pine^2- Trembling Aspen^1
(high dunes)

3h) Sugar Maple^6 - Basswood^2 - Trembling Aspen^2
(north of Jacks Lake)

Figure 13: Type 3 - Upland Intolerant Deciduous Forest



Typical shrub and ground flora includes :

Trientalis borealis
Aralia nudicaulis
Linnaea borealis
Equisetum arvense
Clintonia borealis
Oryzopsis asperifolia
Toxicodendron rydbergii

Acer pensylvanicum
Epigaea repens
Chimaphila umbellata
Pteridium aquilinum
Monotropa uniflora
Mitchella repens
Cornus rugosa

Figure 14 : Young Red Maple - White Birch forest in low (transverse) dunes at north end of Park (Type 3)

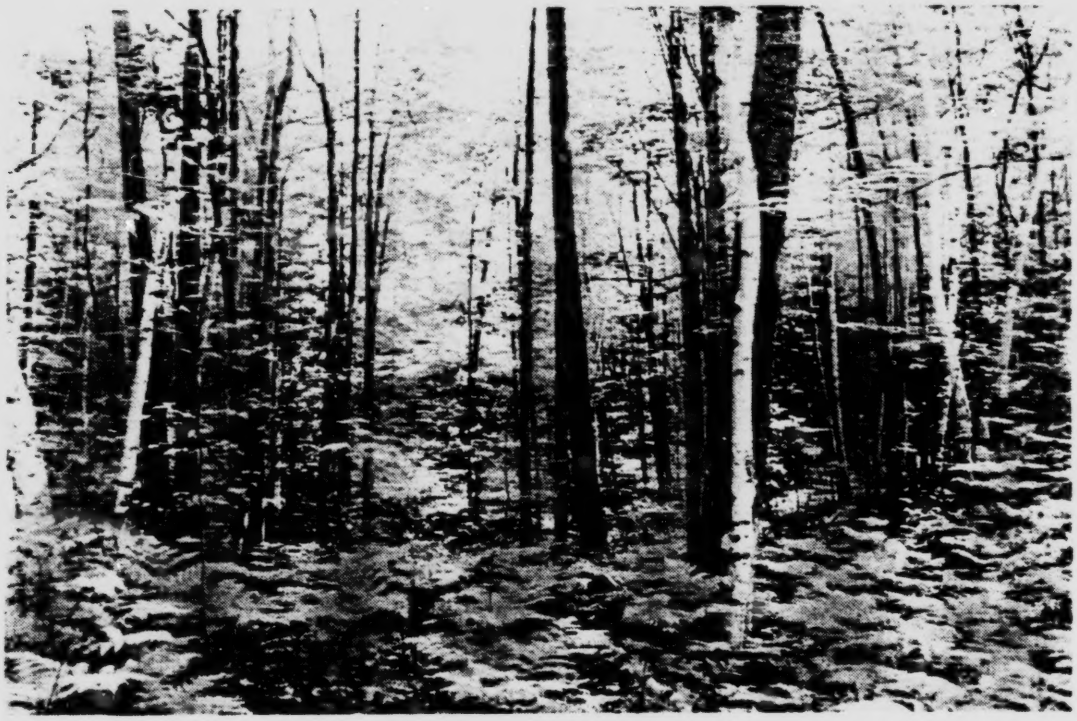
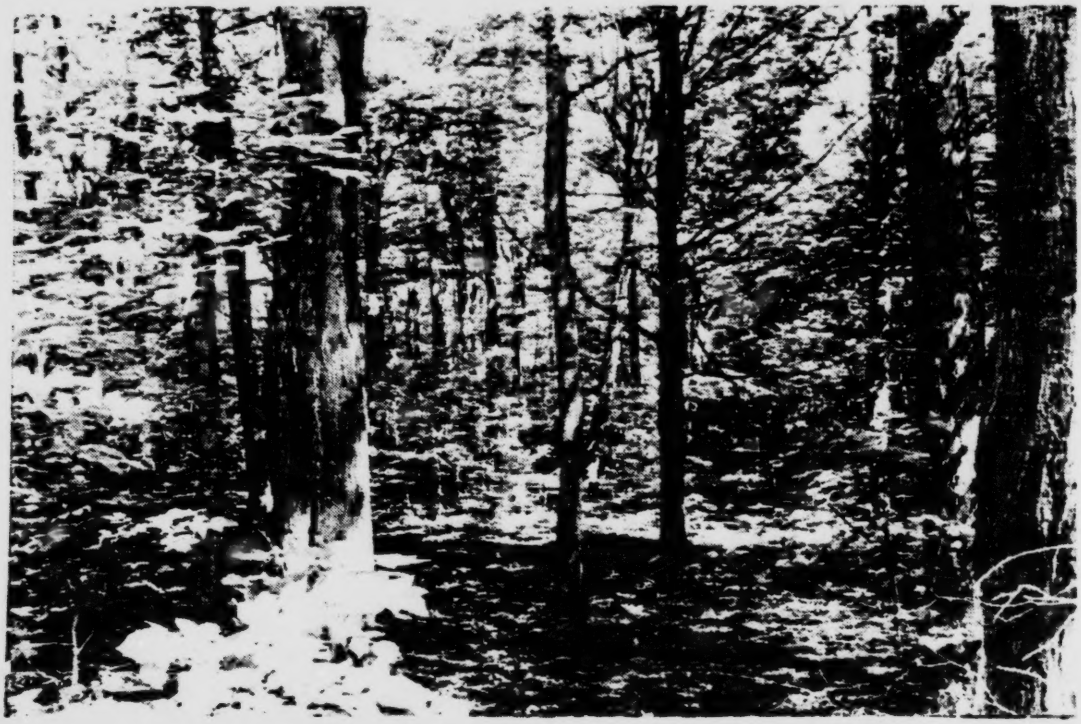


Figure 15 : Young 'Sugar Bush' (Sugar Maple - Basswood - Trembling Aspen woods) northwest of Jacks Lake (Type 3)

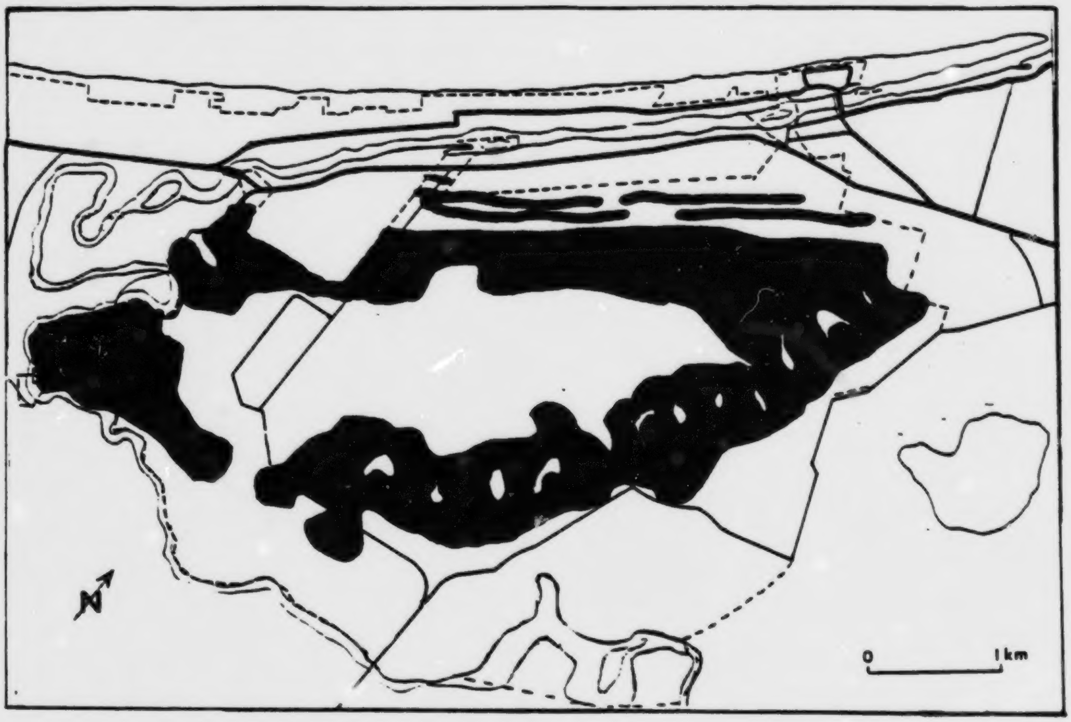


Further Considerations : This vegetation is well represented within the Site District and Region. The regionally rare sedge *Carex platyphylla* is found in this vegetation type.

Vegetation Type 4 : Upland Intolerant Mixed Forest
(Figures 16 and 17)

Site : A variety of dry to mesic, sand-based sites in normal to warmer situations surround the highest portion of the parabolic dunes and extend across the highest portion of the transverse dunes, with smaller stands on higher beach ridges.

Figure 16 : Type 4 - Upland Intolerant Mixed Forest



Characteristics : Dominated by White Pine, Red Oak and Red Maple, much like Type 3, above, but with an increased pine component in this somewhat drier habitat. Large-toothed Aspen, White Birch, Hemlock and Trembling Aspen are locally important elements. The undergrowth is less dense than in Type 3 vegetation .

The vegetation associations recorded from this Type (see Figure 8) are as follows :

4a) Red Maple^4 - White Pine^3 - Red Oak^2 - Large- toothed Aspen^1
(lee side of dunes, Powerline Road)

4b) White Pine^6 - Red Oak^3 -Red Pine^1
(high parabolic dunes)

4c) Red Oak ^{7} - White Pine^{3}
(high parabolic dunes)

4d) Red Pine^{4} - White Pine^{3} - Red Oak^{3}
(high parabolic dunes)

4e) Red Maple^{4} - Cedar^{2} - White Birch^{2} - Hemlock^{2}
(Oakview Woods)

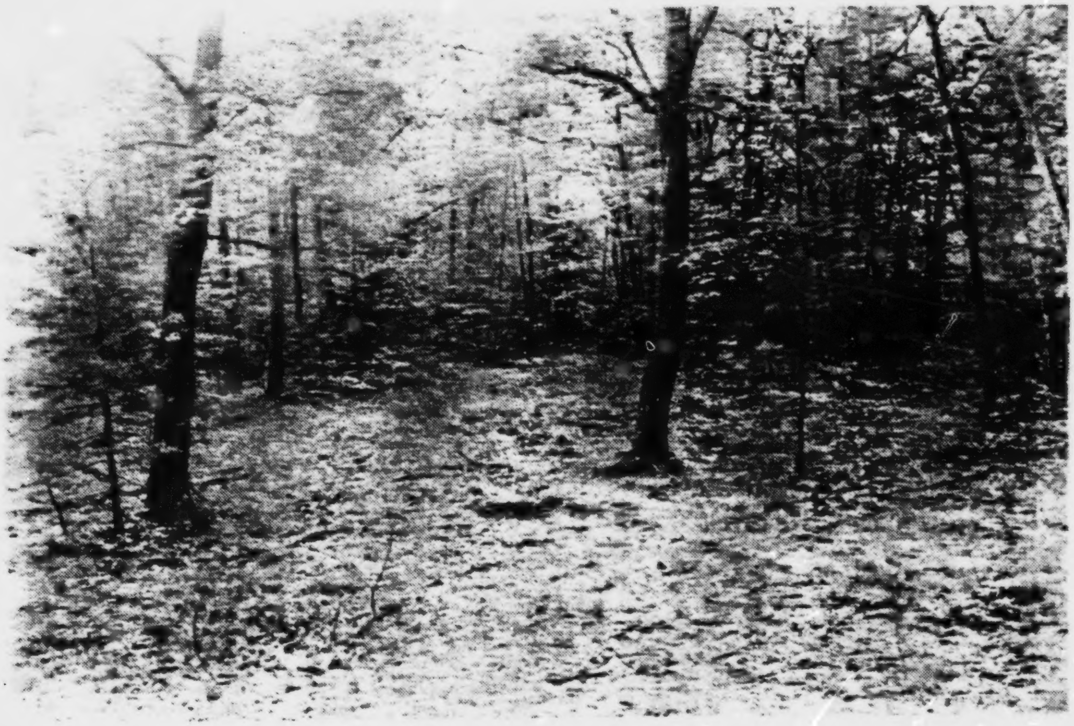
4f) Cedar^{4} - White Birch^{3} - Red Maple^{2} - Green Ash^{1}
(Oakview Woods)

4g) Red Oak^{4} - White Pine^{3} - Trembling Aspen^{3}
(Lookout Dune)

4h) Trembling Aspen^{6} - Cedar^{3} - Large-t. Aspen^{1}
(lee of high dunes N of Powerline Road)

4i) Cedar^{6} - White Birch^{3} - Red Maple^{1}
(Ross's Woods)

Figure 17 : Red Oak - White Pine forest in high transverse dunes at the north end of the park (Type 4)



Typical ground flora includes :

Pteridium aquilinum
Gaultheria procumbens
Lycopodium digitatum
Diervilla lonicera
Maianthemum canadense
Medeola virginiana
Smilacina racemosa
Toxicodendron rydbergii
Oryzopsis asperifolia
Trientalis borealis
Solidago hispida
Aster macrophyllus
Polygala pauciflora
Rubus strigosus
Rosa acicularis
Equisetum arvense

Further considerations : The Type is fairly well represented in the Site District when taken as a whole (Hanna 1984) but the drier, warmer site associations found on the higher dune areas of Wasaga Beach Provincial Park are uncommon. In addition, 8 regionally significant plants (*Carex foenea*, *C. lucorum*, *C. umbellata*, *Maianthemum canadense* var, *interior*, *Platanthera hookeri*, *Hamamelis virginiana*, *Viola adunca* and *Halenia deflexa*) and one nationally endangered species, the wintergreen *Chimaphila maculata*, significantly enhance the importance of this Vegetation Type.

Vegetation Type 5 : Upland Intolerant Coniferous Forest (Figures 18 and 19)

Site : On dry to very dry sites in sand on warmer slopes, dune summits and plains across the high parabolic dune area of the park.

Figure 18 : Type 5 - Upland Intolerant Coniferous Forest

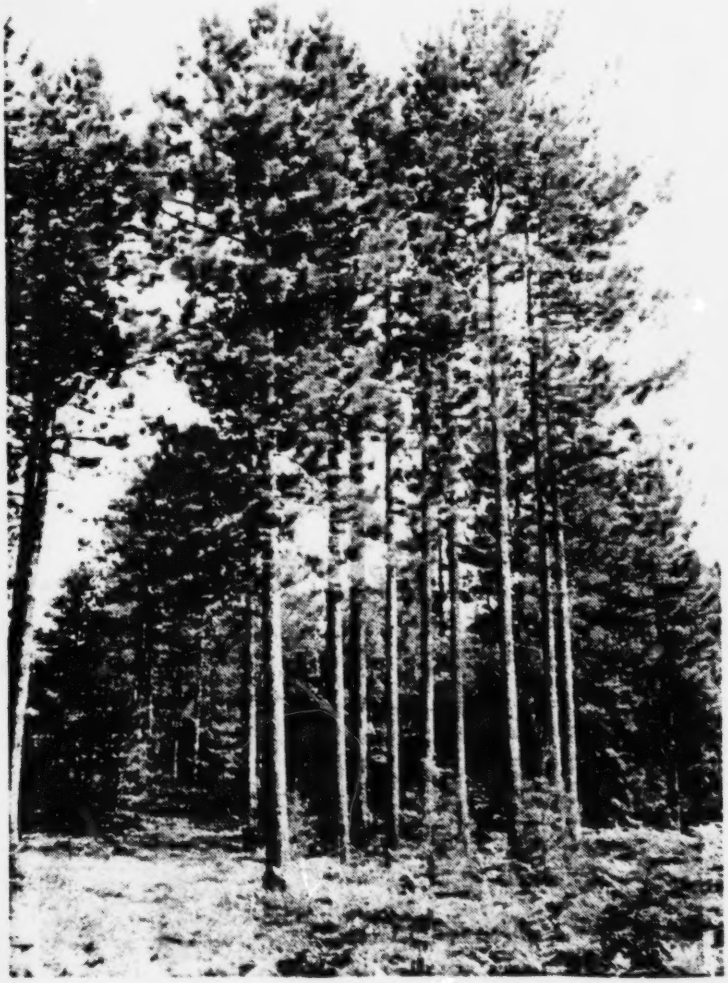
Characteristics. Dominated by Red and White Pine, with scattered Red Oak, Trembling Aspen and occasional White Oak and White Ash. This is an open canopy association, with pure stands of even-aged pine dominating an open ground flora of low ericaceous shrubs and graminoids. The association is dependent on fire for its initiation and for its long term survival.

The vegetation associations recorded from this Type (see Figure 8) are as follows:

5a) White Pine^6 - Red Pine^4
(High parabolic dunes)

5b) Red Pine^8 - White Pine^2
(high parabolic dunes)

Figure 19: Red Pine stand with sparse undergrowth near lookout Dune (Type 5)



Typical ground flora includes:

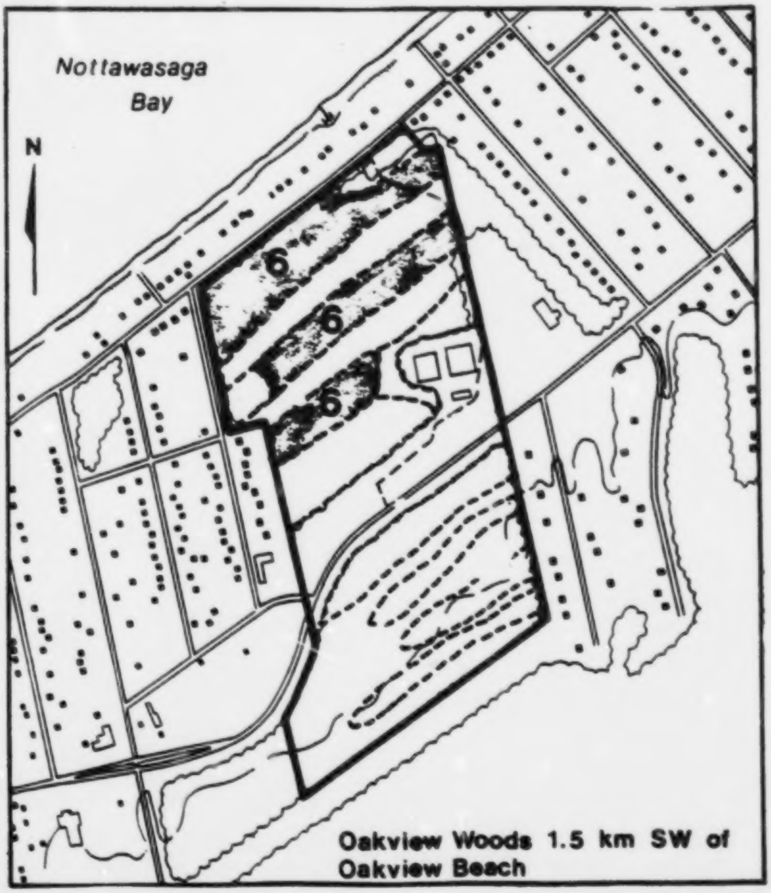
Comptonia peregrina
Dichanthelium sabulorum
Ceanothus herbaceus
Danthonia spicatum
Agropyron trachycaulum
Festuca rubra
Deschampsia flexuosa
Vaccinium angustifolium
Carex pensylvanicum
Pteridium aquilinum
Lithospermum carolinense
Arabis lyrata
Anemone virginiana
Bromus ciliatus

Further considerations : Hanna (1934) identified this as part of a complex of sand-based landforms and vegetation that was not well represented in Site District 6-6. She noted that the Wasaga Beach Provincial Park area was the best candidate for providing representation of this element. The nationally rare thistle Cirsium hillii and 5 regionally significant species (Lycopodium Xhabereri, L. obscurum var. obscurum, Maianthemum canadense var. interior, Platanthera orbiculata and Hieracium gronovii) are found here.

Vegetation Type 6 : Upland Tolerant Coniferous Forest

Site: On cooler, wet-mesic sand ridges and hummocks along the raised beaches in Oakview and Ross's Woods and in very small, scattered sites in the raised beach area of dune fields.

Figure 20 : Type 6 - Upland Tolerant Coniferous Forest



Characteristics : Hemlock and Cedar dominate this Type, with scattered Yellow Birch, Balsam Fir, White Birch and Red Maple. The understory is typically very sparse due to the excessive shade offered by the tree canopy.

The vegetation associations recorded from this Type (see Figure 8) are as follows:

6a) Hemlock^{6} - Cedar^{3} - Red Maple^{1}
(Oakview Woods)

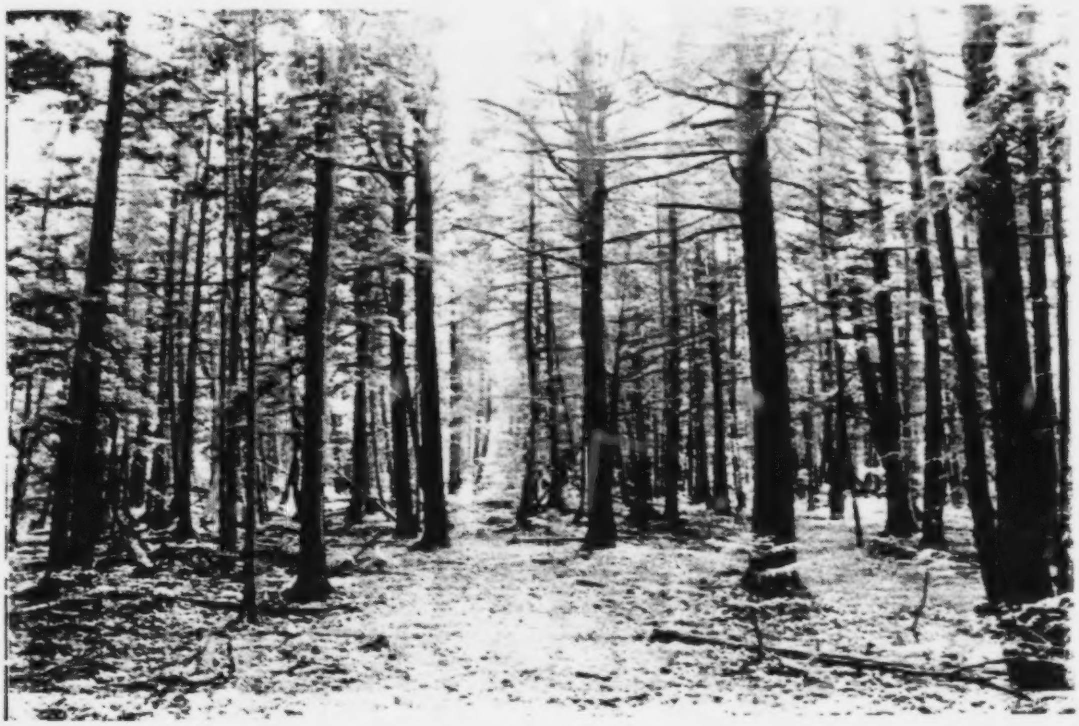
6b) Cedar^{8} - White Birch^{1} - Red Maple^{1}
(Oakview Woods)

6c) Hemlock^{8} - Cedar^{2}
(Oakview Woods)

Typical ground flora includes :

Aralia nudicaulis
Trientalis borealis
Coptis trifolia
Botrychium virginianum
Goodyera oblongifolia
Polygala pauciflora
Maianthemum canadense
Clintonia borealis
Carex eburnea
Calypso bulbosa
Carex castanea
Pyrola chlorantha

Figure 21 : Hemlock stand on a raised beach ridge in Oakview Woods (Type 6)

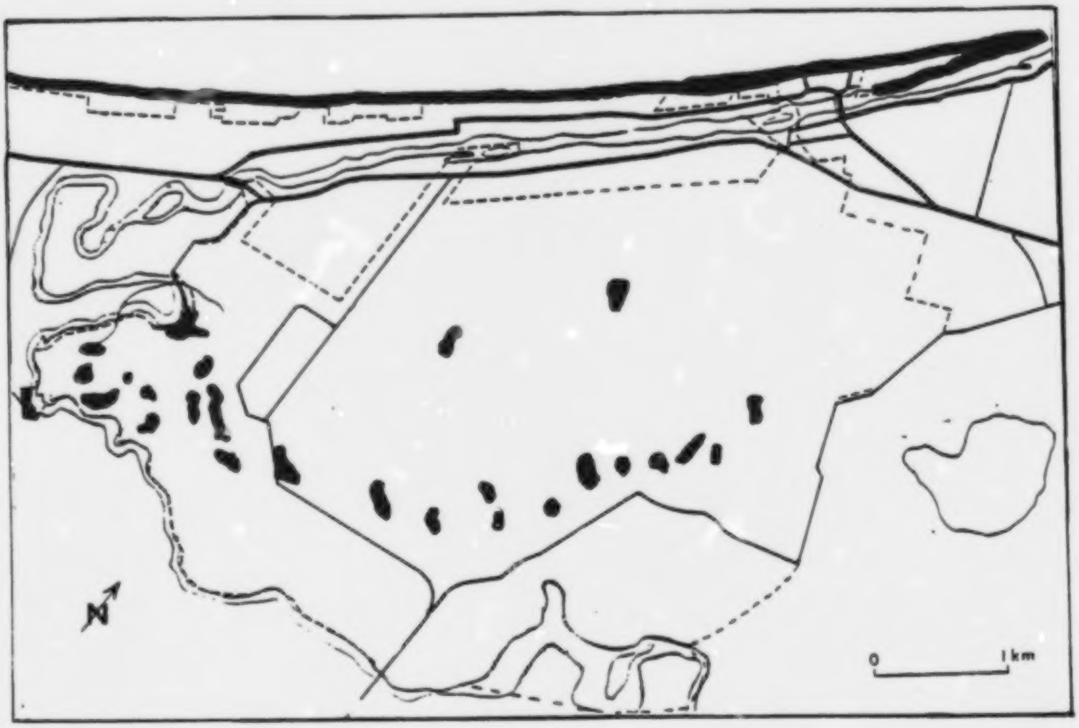


Further considerations : The shoreline Hemlock forests constitute a regionally significant vegetation. The presence of 5 regionally significant plant species (Carex capillaris, Calypso bulbosa, Goodyera oblongifolia x tesselata, Platanthera orbiculata and Halenia deflexa), adds to the level of importance of the vegetation.

Vegetation Type 7 : Sand Barrens
(Figures 22, 23, 24 and 25)

Site : On arid to very dry sand in warmer to normal sites along the Nottawasaga Bay shore, in cuts along the river through the dune fields and in blow-outs across the high dunes.

Figure 22 : Type 7 - Sand Barrens



Characteristics : Vegetation is sparse, with areas of open sand intermixed in patches of graminoid growth and dry land shrubs and drought-resistent willows; a wide variety of dominants are involved, depending upon the particular history and situation in a given area. These vegetation associations are early successional and persist only so long as disturbance - human or natural - maintains the status quo.

Figure 23: Beach grasses growing on active beach dunes at Beach 6

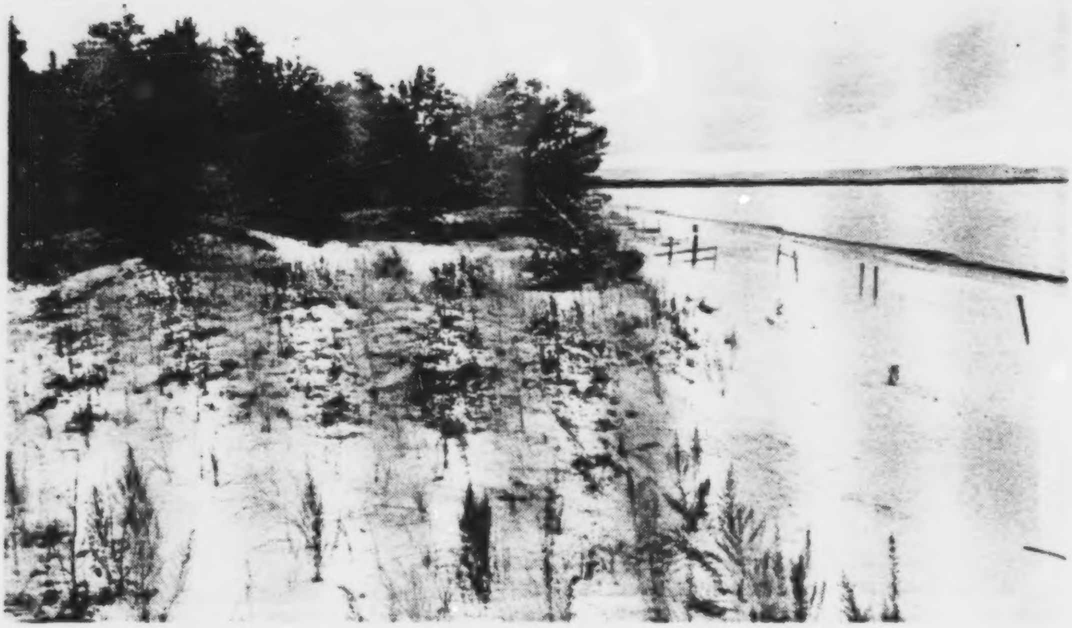


Figure 24: Open sand slope at The Oxbow, Nottawasaga River

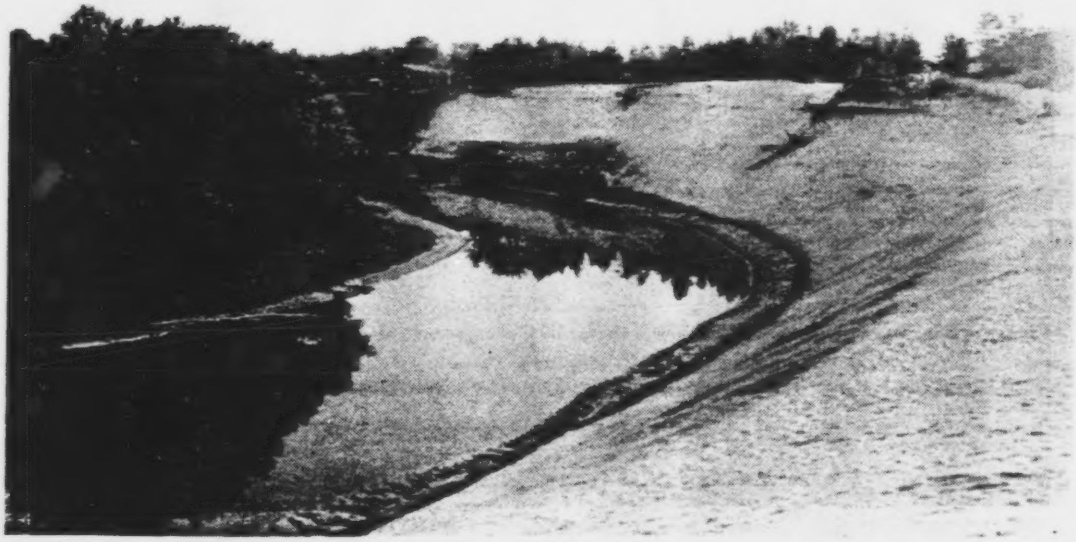
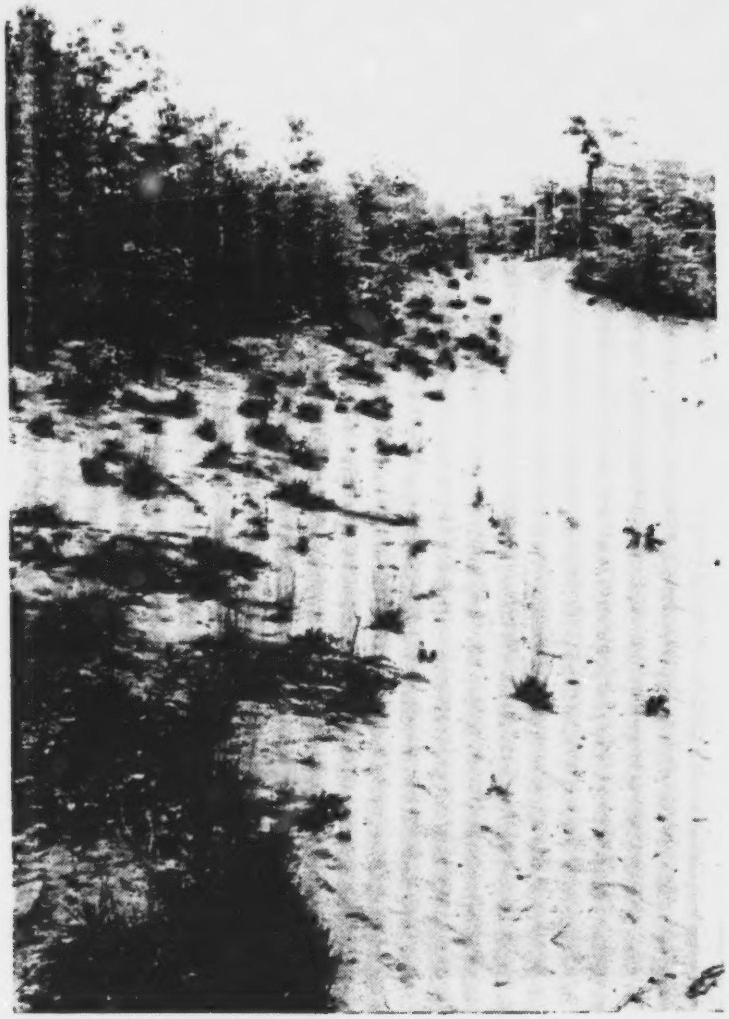


Figure 25: Sparse Agropyron trachycaulum - Oneothera okesiana growth in blow-out at Lookout Dune.



The vegetation associations recorded from this Type (see Figure 8) are as follows:

7a) *Cakile edentula*^{3} - *Laythyrus japonicus*^{3} - *Salsola pestifer*^{2} - *Salix exigua*^{2}
(Beach 1)

7b) *Andropogon scoparius*^{4}- *Asclepias tuberosa*^{2} - *Comandra umbellata*^{2} - *Arabis lyrata*^{2}
(Lookout Dune)

7c) *Salix cordata*^{3} - *Prunus pumlia*^{3} - *Elymus canadensis*^{2} - Artemisia campestris^2
(Beach 6)

7d) Sporobolis cryptandrus^3 - Andropogon scoparius^3
- Pteridium aquilinum^2 - Arabis lyrata^1 - Equisetum hyemale^1
(high dunes near Powerline Road)

7e) Potentilla fruticosa^4 - Andropogon scoparius^3
-Panicum virgatum^2 - Aster laevis^1
(New Wasaga Beach)

Typical ground flora includes :

Ammophila breviligulata
Agropyron trachycaulum
Juncus balticus
Aster laevis
Oenothera oakesiana
Elymus canadensis
Pteridium aquilinum
Potentilla fruticosa
Cakile edentula
Artemisia campestris
Scirpus americanus
Prunus pumila spp. pumila
Arabis lyrata
Lathyrus japonicus
Panicum virgatum
Asclepias tuberosa
Salix cordata
Arabis holboelii

Further considerations : Examples of this vegetation and landform in natural condition are rare in the Site District and Region. This Type also supports 9 regionally significant plant species (Carex foenea, Festuca saximontana, Salix cordata, Arabis drummondii, Polygala polygama Ceanothus herbaceus, Helianthemum canadense, Oenothera oakesiana and Asclepias tuberosus) and the nationally rare sedge Cyperus houghtonii.

Vegetation Type 8 : Upland Meadows and Dry Thickets (Figures 26, 27, 28 and 29)

Site: Very dry to dry, warmer, sand sites in the higher transverse dunes and across the parabolic dunes resulting from natural disturbances are typical of the sand prairies of the dune lands. Mesic, normal sandy loam of silty-sand based sites along the Nottawasaga River and beside major roadways represent meadows and thickets resulting from over-growing agricultural lands.

Figure 26 : Type 8 - Upland Meadows and Thickets

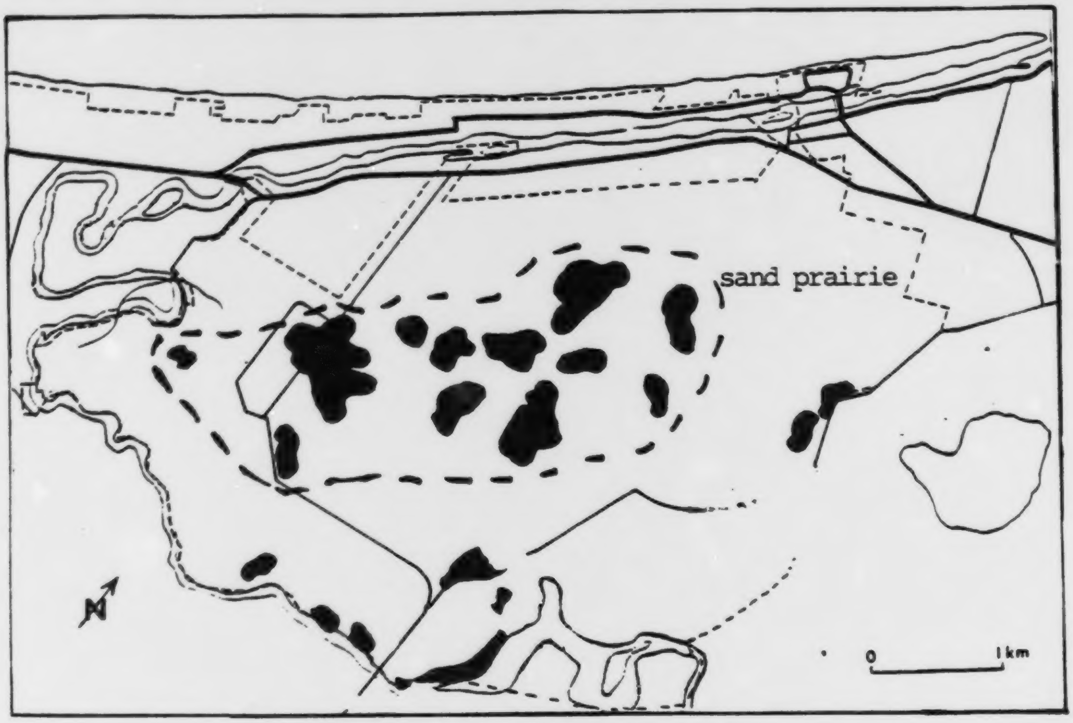

sand prairie
N
0
1km

Figure 27 : Sand blow-out advancing over disturbed meadow along Powerline Road (Type 8)

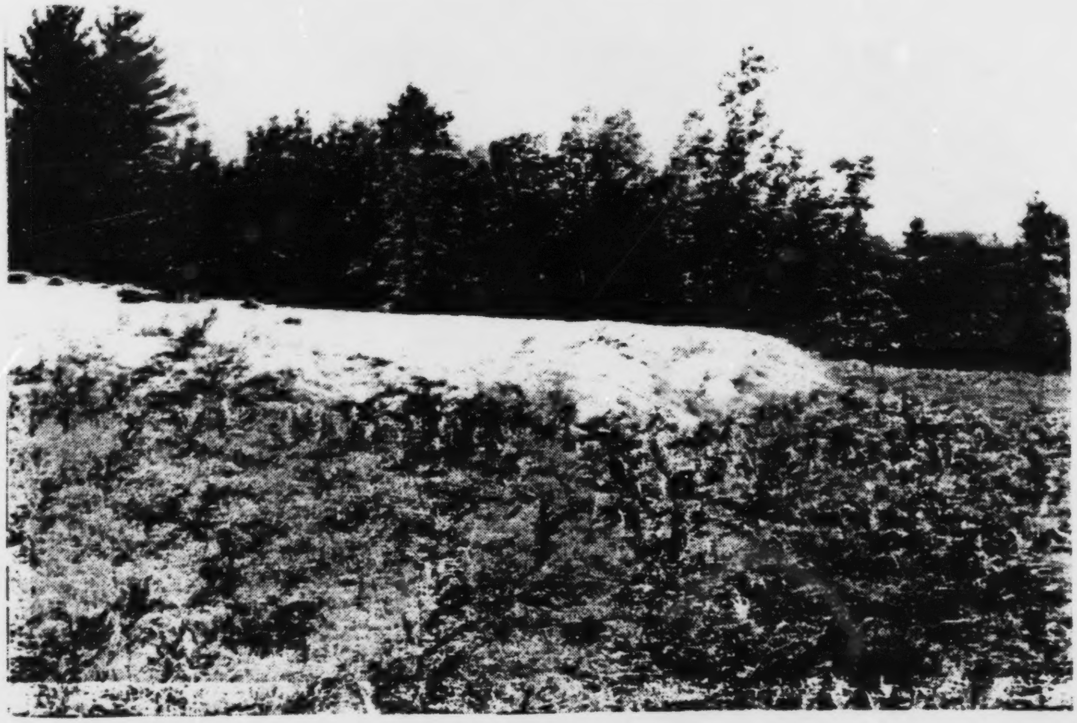


Figure 28: Old sand prairie in pine forest in high dunes (Type 8)

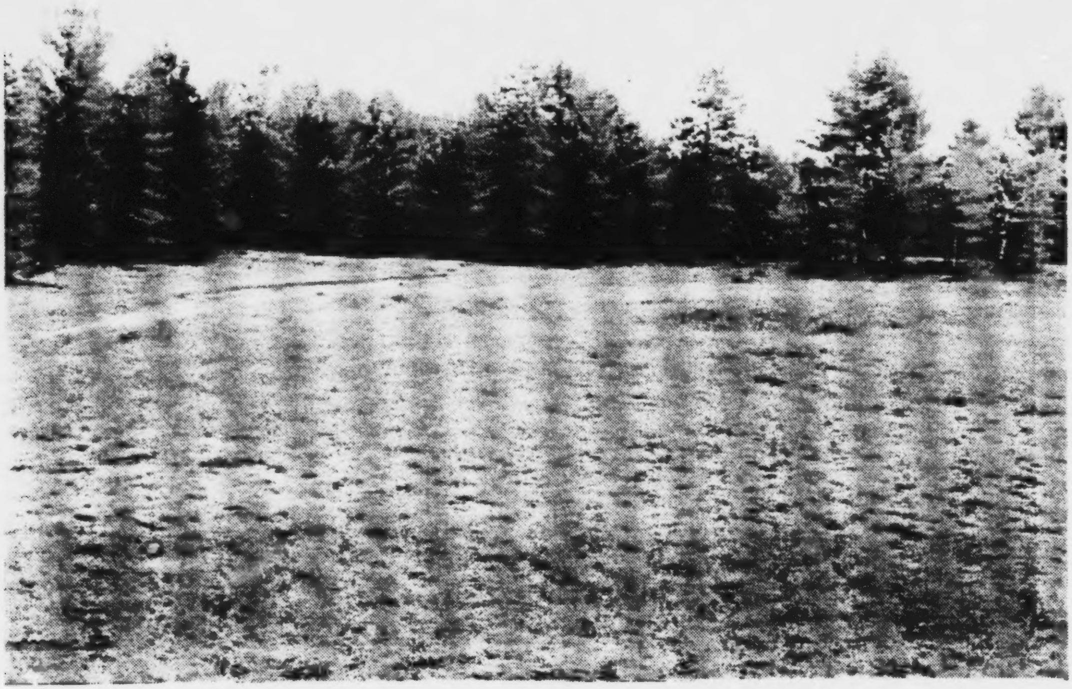
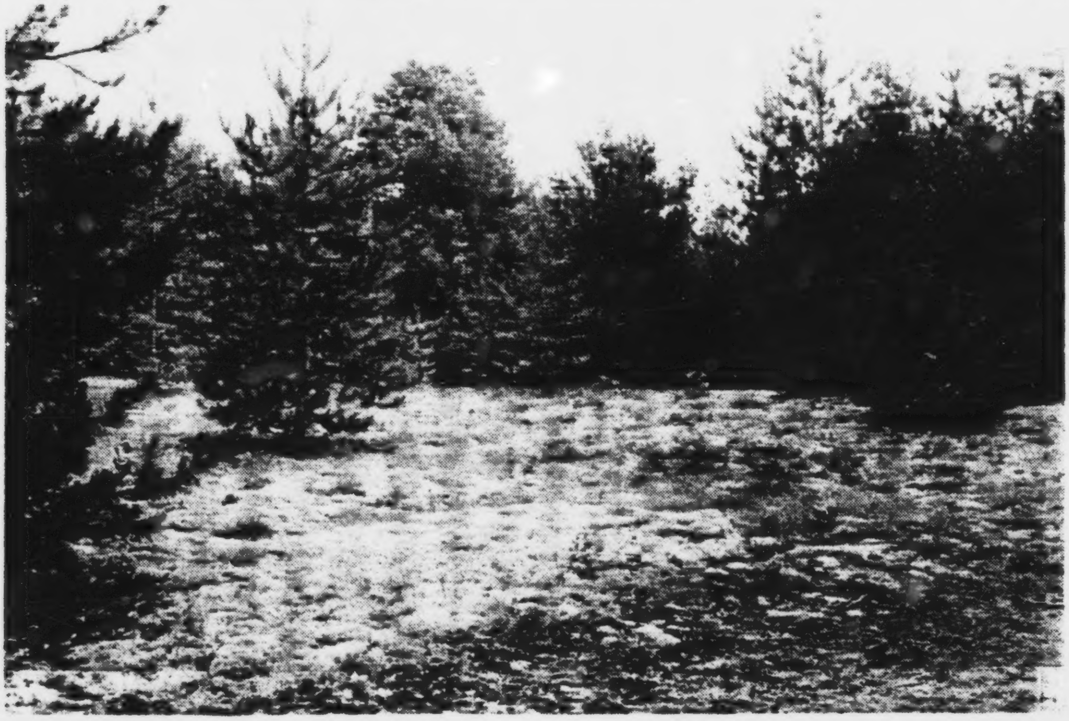


Figure 29: Sterile Danthonia Spicata - Cladina (lichen) sand prairie in pine forest - in high dunes (Type 8)



Characteristics : A wide variety of drought-resistent graminoids with prairie and southern affinities dominate sand prairies in the Wasaga dunes, especially *Andropogon scoparius*, *Deschampsia flexuosa*, *Danthonia spicata* and the sedge *Carex pensylvanica*. A number of heath shrubs, like Sweet-fern and Huckleberry, combine with less common shrubs and herbaceous species to produce distinctive associations of early successional vegetation that are dependent on fire or other forms of natural disturbance for their continuance as viable communities. Such sites occur within the pine or pine-oak forests (Types 4 and 5).

Disturbed sites recovering from agricultural development along the river and elsewhere in the Nottawasaga flood plain offer different forms of meadows, with greater densities of plants, fewer xerophytes, a higher percentage of alien species and a more diverse set of associated forested conditions.

Typical ground flora includes :

Cyperus houghtonii
Lithospermum carolinense
Helianthemum canadense
Sorghastrum nutans
Arctostaphylos uva-ursi
Deschampsia flexuosa
Comptonia peregrina
Commandra umbellata

Pteridium aquilinum
Hieracium pilosella
Hieracium canadense
Carex pensylvancia
Danthonia spicata
Hypericum perforatum
Vaccinium myrtilloides
Carex foenea

The vegetation associations recorded from this Type (see Figure 8) are as follows :

8a) *Danthonia spicata*^{6} - *Cladina* (lichen)^{3} - *Pteridium aquilinum*^{1}
(high dunes west of Powerline Road)

8b) *Crataegus* spp.^{6} - *Cornus stolonifera*^{3}- Cedar^{1}
(Nottawasaga River east of Klondike Road)

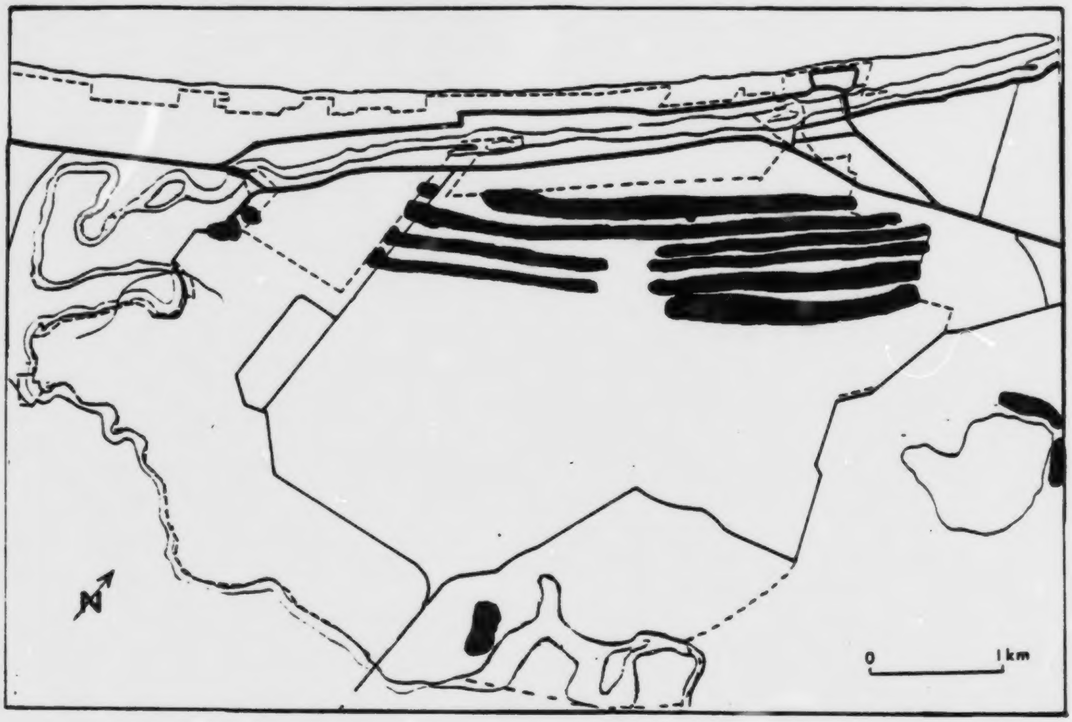
8c) *Solidago canadensis*^{5} - *Rubus strigosus*^{4} - *Ulmus americana*^{1}
(north of Jacks Lake)

Further considerations: The recovering agricultural meadows (non-native elements) are of minimal natural significance. The native sand prairie elements, however, are highly significant and of provincial importance. There are 9 regionally significant plant species known from this vegetation: *Festuca saximontana*, *Crataegus flabellata*, *Polygala polygama*, *Ceanothus americanus*, *Ceanothus herbaceus*, *Helianthemum canadense*, *Oenothera oakesiana*, *Asclepias tuberosa* and *Hieracium gronovii*.

Vegetation Type 9 : Lowland Intolerant Deciduous Swamp Forest (Figure 30).

Site : Found in wet to very wet, normal to cooler depressions in sand substrates in the raised beaches areas of the dunes and in calcareous, alluvial substrates in wet, cooler sites near Jacks Lake and Marl Lake.

Figure 30 : Type 9 - Lowland Intolerant Deciduous Swamp Forest



Characteristics : Black and Green Ash, with a variety of other species capable of withstanding seasonal inundation, dominate this vegetation. It is typically in small stands, such as the swales between beach ridges and along river shores. The understory is generally diverse and with a tangle of shrub and tall herbaceous species. It usually succeeds to tolerant deciduous forest (Silver Maple swamps) along the river or to mixed intolerant or tolerant coniferous lowland forests in the beach swales.

The vegetation associations that were recorded from this Type (see Figure 8) are as follows :

9a) Black Ash[10]
(raised beaches at north end of the park)

9b) Crack Willow^{10}
(Nottawasaga River by the boat launch)

9c) Green Ash^{5} - White Elm^{3} - Sugar Maple^{1} - Cedar^{1}
(N side of Jacks Lake)

9d) Black Ash^{9} - Cedar^{1}
(Ross's Woods)

Typical ground flora includes

Galium palustre
Onoclea sensibilis
Carex hystericina
Cornus stolonifera
Pilea pumila
Thelypteris palustris
Carex intumescens
Circaea lutetiana
Glyceria striata
Cardamine pensylvanica
Carex disperma
Iris versicolor
Equisetum arvense
Rhamnus alnifolia
Toxicodendron rydbergii
Aster lateriflorus

Further considerations: This Type is well represented within the Site District and is of moderate natural significance in its own right (Hanna 1984). The geomorphological significance of the site (Carlisle et al. 1972) and the presence of 3 regionally significant plant species (Sparganium minimum, Alopecurus aequalis and Carex pallescens) enhances that importance.

Vegetation Type 10 - Lowland Intolerant Mixed Swamp Forest (Figure 31)

Site : On wet to wet-mesic sites along the Nottawasaga River flood plain in silty-sand substrates in normal to cooler sites and in similar situations near Marl Lake.

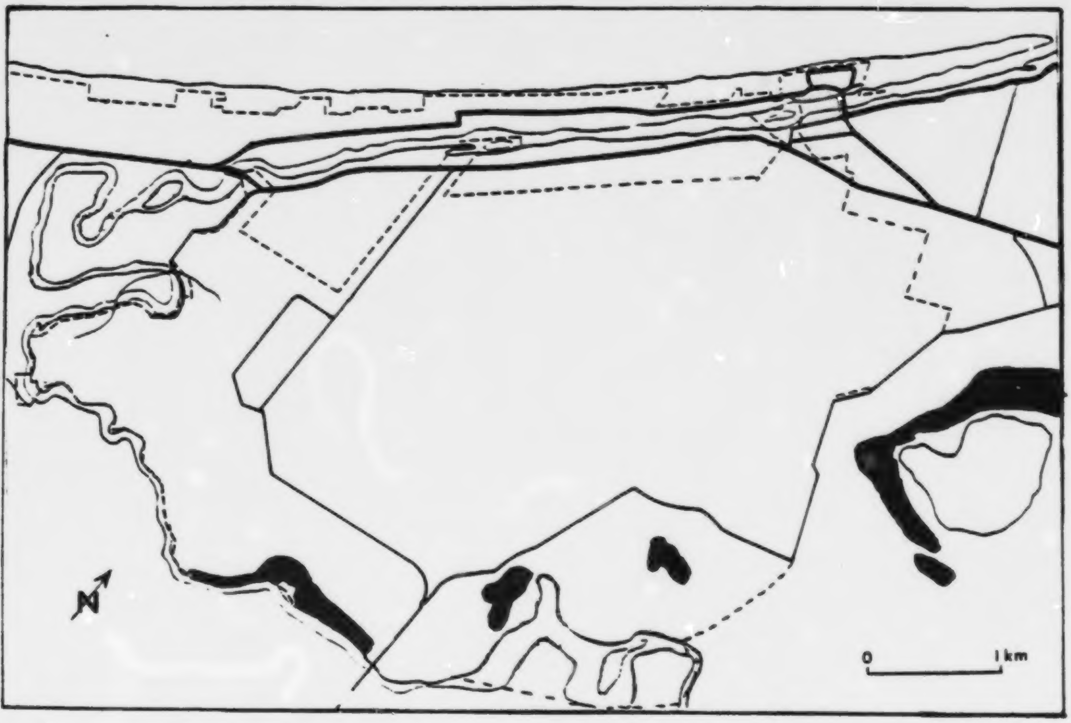
Characteristics : Cedar, White Birch, Green Ash and Elm dominate scrubby forest along the river flood-plain and at Ross's Woods, with Balsam Poplar, Balsam Fir and Red Maple being locally important. The understory is dense, with a high proportion of tree saplings and woody shrubs tangling with tall herbaceous vegetation. Lowland tolerant vegetation (Hemlock and Cedar swamp forest) will ultimately dominate such sites.

Typical species include :

Carex flava
Ribes triste
Cypripedium reginae
Carex buxbaumii
Lysimachia ciliata
Carex castanea
Viburnum opulus var. americana
Cornus stolonifera
Ilex verticillata
Carex aurea

Cystopteris bulbifera
Eupatorium rugosum
Toxicodendron rydbergii
Athyrium filix-femina
Matteuccia struthiopteris
Dryopteris austriaca

Figure 31 : Type 10 - Lowland Intolerant Mixed Swamp Forest



The vegetation associations recorded from this Type (see Figure 8) are as follows :

10a) Cedar^7 - White Birch^3
(Powerline Road flats)

10b) Cedar^4 - Balsam Fir^3 - Trembling Aspen^2 - Green Ash^1
(Oakview Woods)

10c) Cedar^6 - Balsam Poplar^2 - White Birch^2
(Klondike Trailer Park)

10d) Cedar^6 - Elm^4
(Nottawasaga River at Klondike Road)

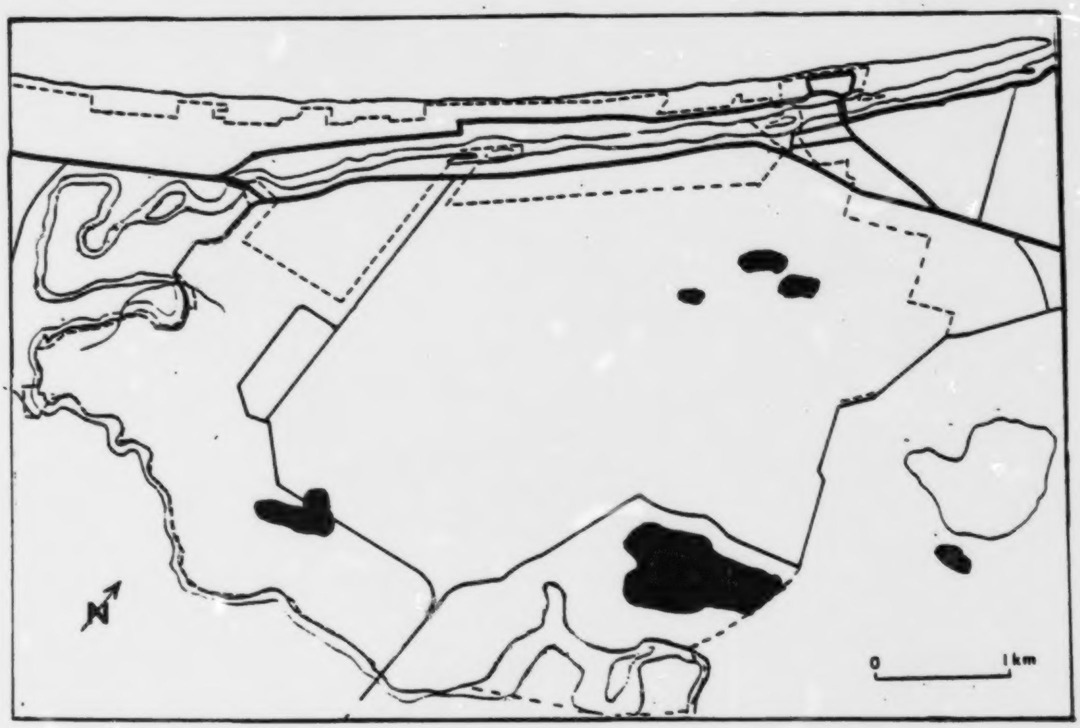
10e) Cedar^7 - White Birch^2 - Green Ash^1
(Jacks Lake)

Further considerations : Well represented within the Site District (Hanna 1984) and only of moderate life science significance.

Vegetation Type 11 - Lowland Intolerant Coniferous Swamp Forest (Figures 32 and 33)

Site : On wet to saturated sand or organic substrates in cooler microclimates. Sites in the raised beach swales are small and spring-flooded, though frequently drier (or dry) by late summer. Spring-fed and seepage-based forest below the leeward face of the parabolic dunes are saturated throughout the spring to fall period.

Figure 32 : Type 11 - Lowland Intolerant Coniferous Swamp Forest



Characteristics : White Cedar, Larch, Balsam Fir and Black Spruce dominate this Type, with Red Maple, White Birch Trembling Aspen occuring in small numbers. The tree growth is often dense with sparse undergrowth (e.g. in Cedar - Balsam Fir sites) or more open with more dense undergrowth (e.g. the Cedar - Larch stands). Substrates are circumneutral (ph 6 - 7 at the Jacks Lake fen); these sites eventually succeed to tolerant coniferous lowland forests (Cedar and/or Cedar-Hemlock).

The vegetation associations recorded from this Type (see Figure 8) are as follows :

11a) Cedar^9 - Balsam Fir^1
(transverse dunes in north of the park; Ross's Woods)

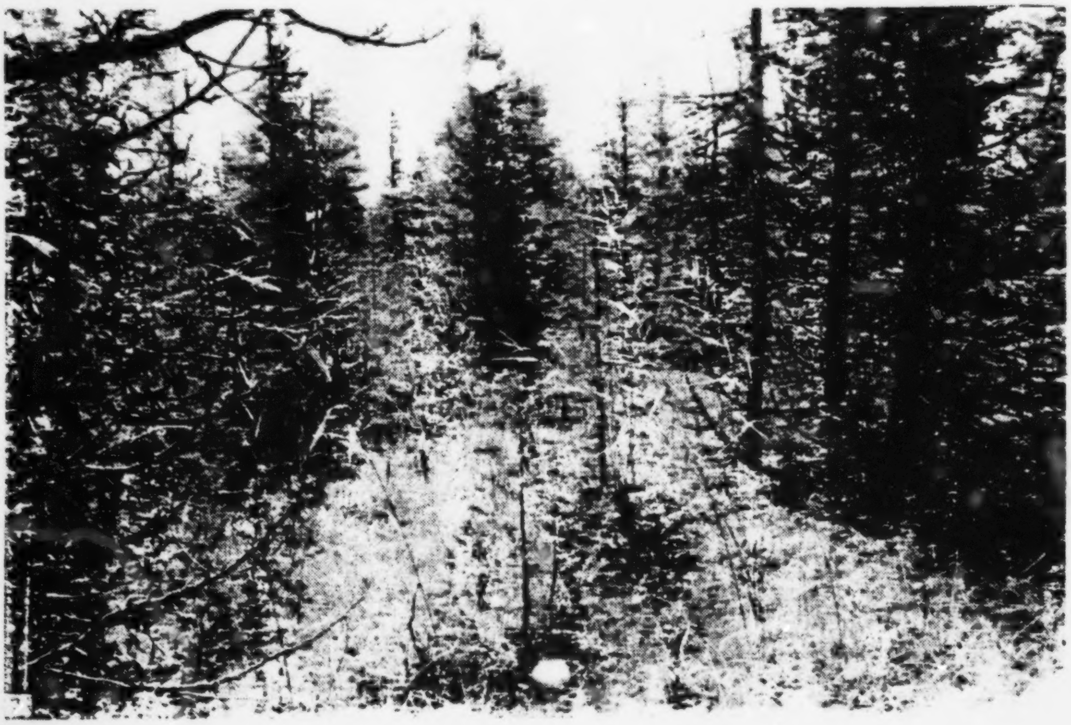
11b) Cedar^7 - Balsam Fir^2 - White Birch^1
(Ross's Woods)

11c) Cedar^6 - Black Spruce^3 - Red Maple^1
(Powerline Road bog)

11d) Cedar^5 - Balsam Fir^3 - Black Spruce^2
(Jacks Lake fen)

11e) Cedar^6 - Larch^4
(Jacks Lake fen; Marl Lake)

Figure 33 : Cedar - Larch swamp forest (Type 11) with graminoid fen clearings (Type 17) north of Jacks Lake



Typical ground flora includes :

Carex castanea
Clintonia borealis
Equisetum scirpoides
Mitella nuda

Goodyera repens
Athyrium filix-femina
Thelypteris palustris
Lycopodium lucidulum
Carex trisperma
Dryopteris cristata
Cypripedium reginae
Smilacina trifolia
Petasites palmatus
Acer spicatum
Coptis trifolia
Ribes triste
Circaea alpina
Linnaea borealis
Aster puniceus
Alnus rugosa

Further considerations: An uncommon Type locally and sometimes missing within the Site District (Hanna 1984); supports many locally significant plants. Two highly significant insect species (see Figure 71) were observed here.

Vegetation Type 12 : Lowland Tolerant Deciduous Swamp Forest (Figures 34, 35 and 36)

Site : On flood plain sites in wet to saturated silty-sand in normal situations. Flooded in spring and usually very wet or flooded throughout most of the summer period.

Figure 34 : Type 12 - Lowland Tolerant Deciduous Swamp Forest

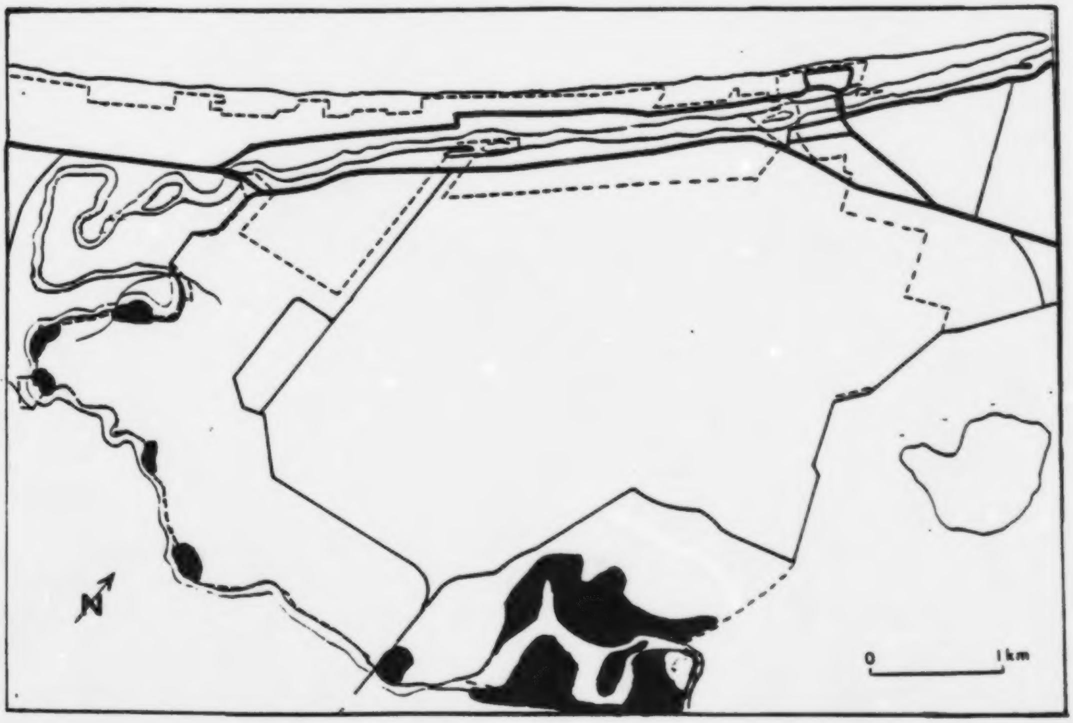


Figure 35: Spring-flooded Silver Maple swamp with dense Sensitive Fern ground cover; southeast shore of Jacks Lake (Type 12)

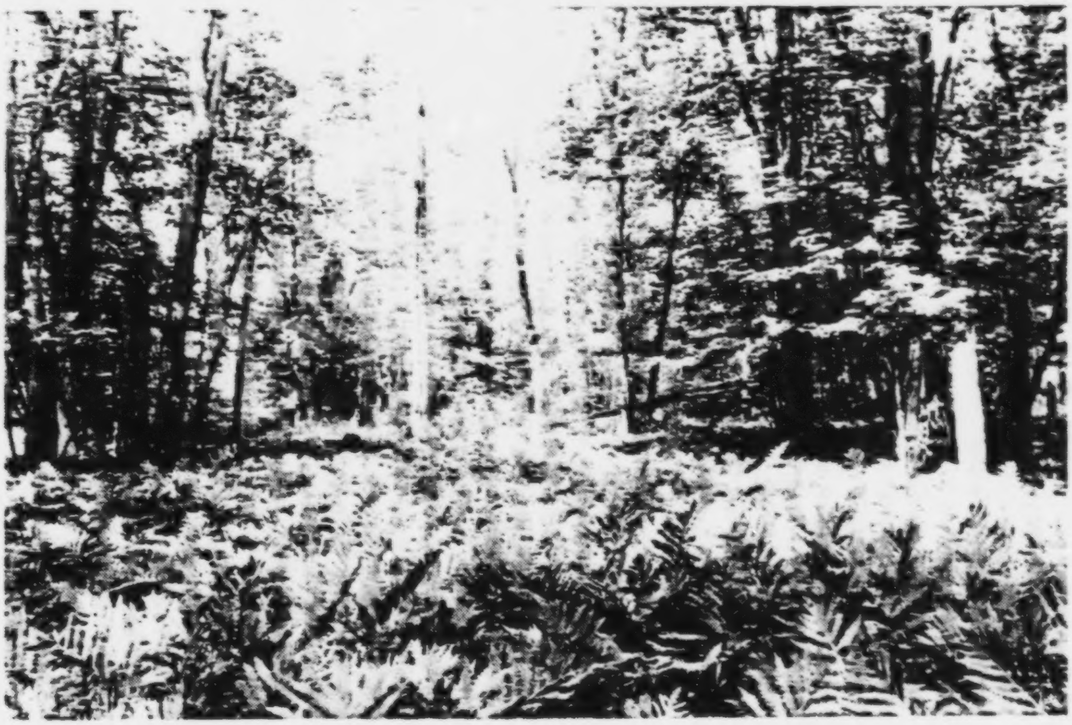
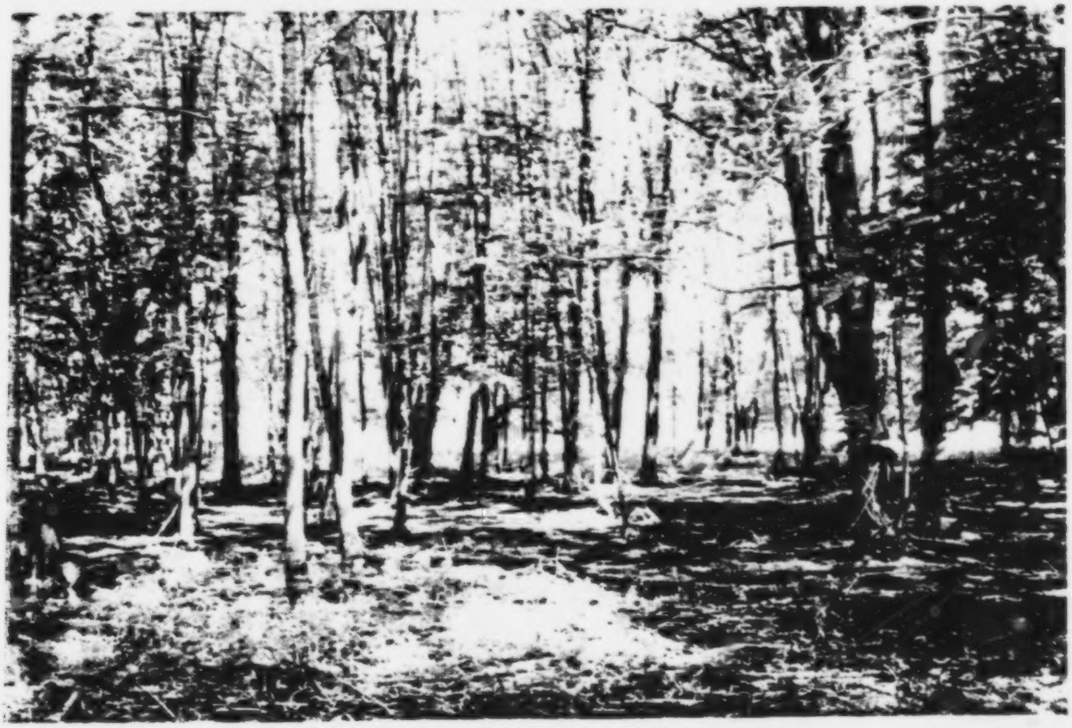


Figure 36: Low Silver Maple swamp with sparse undergrowth north shore Jacks Lake (Type 12)



Characteristics : Silver Maple dominates, with small proportions of Green Ash, Cedar and Elm. In sites where spring flooding is deep and a heavy load of silty sand is deposited, undergrowth is sparse; sites less exposed to sedimentation support lush undergrowth of shade tolerant herbaceous species.

Typical species include :

Cephalanthus occidentalis
Bidens frondosa
Aster lateriflorus
Menispermum canadense
Alnus rugosa
Leersia oryzoides
Thelypteris palustris
Pilea pumila
Lysimachia thrysiflora
Onoclea sensibilis
Carex tuckermanii
Polygonum hydropiperoides
Lobelia cardinalis
Toxicodendron rydbergii

Further considerations: Not a common Type in the Site District (Hanna 1984) and largely being disturbed or destroyed along sections of the Nottawasaga River flood plain; of moderate regional significance. Two regionally significant species of plants (Carex grayii and Amaranthus tuberculatus) and many locally significant species occur here.

Vegetation Type 13 : Thicket Swamp
(Figure 37)

Site : Wet-mesic to saturated substrates of various forms, including organic and sand situations, support this vegetation in a variety of normal to cooler situations along the Nottawasaga River, at Oakview Woods, near Marl Lake and in small disturbed sites near roadways, as well as in tiny stands in the raised beaches.

Characteristics : A dense tangle of various shrubs and tall herbaceous species is typical, often with small graminoid clearings adjacent to it and/or a variety of lowland forest types. Many tiny sites, too small to map, occur within such forested sites.

The vegetation associations recorded from this Type (see Figure 8) are as follows:

13a) Potentilla fruticosa^{3} - Cedar (seedlings)^{3} - Hypericum kalmianum^{2} - Cornus stolonifera^{2}
(Powerline Road flats)

13b) Alnus rugosa^{10}
(north end Marl Lake)

13c) Cedar (seedlings)^{5} - Cornus stolonifera^{5}
(north end Marl Lake)

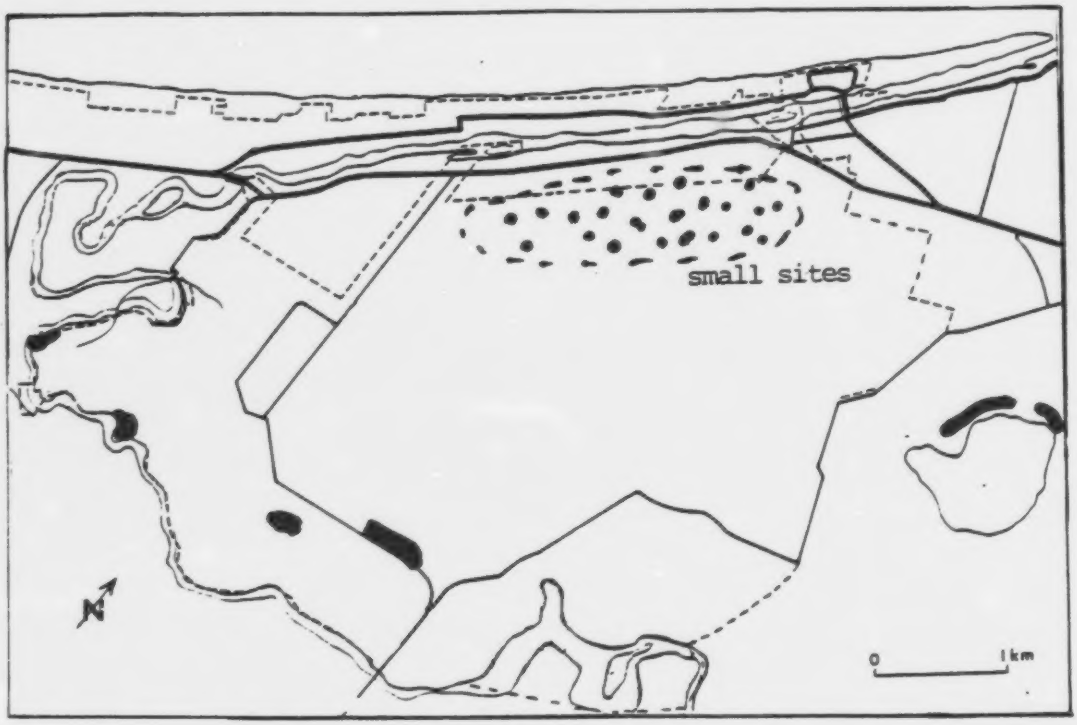
13d) Cornus stolonifera^{6} - Vitis riparia^{4}
(Nottawasaga River by boat launch)

13e) Alnus rugosa^{7} - Salix bebbii^{2} - Balsam Poplar^{1}
(north of Marl Lake)

13f) Salix petiolaris^{7} - S. bebbii^{3}
(north of Marl Lake)

13g) Cornus stolonifera^{5} - Cedar (seedlings)^{3} - Cedar^{2}
- Solidago canadensis^{2}
(Nottawasaga River by Klondike Road)

Figure 37 : Type 13 - Thicket Swamp



Typical ground flora includes :

Aster lateriflorus
Fraxinus pensylvanica (seedlings)
Equisetum arvense
Rubus pubescens
Carex disperma
Carex crinita

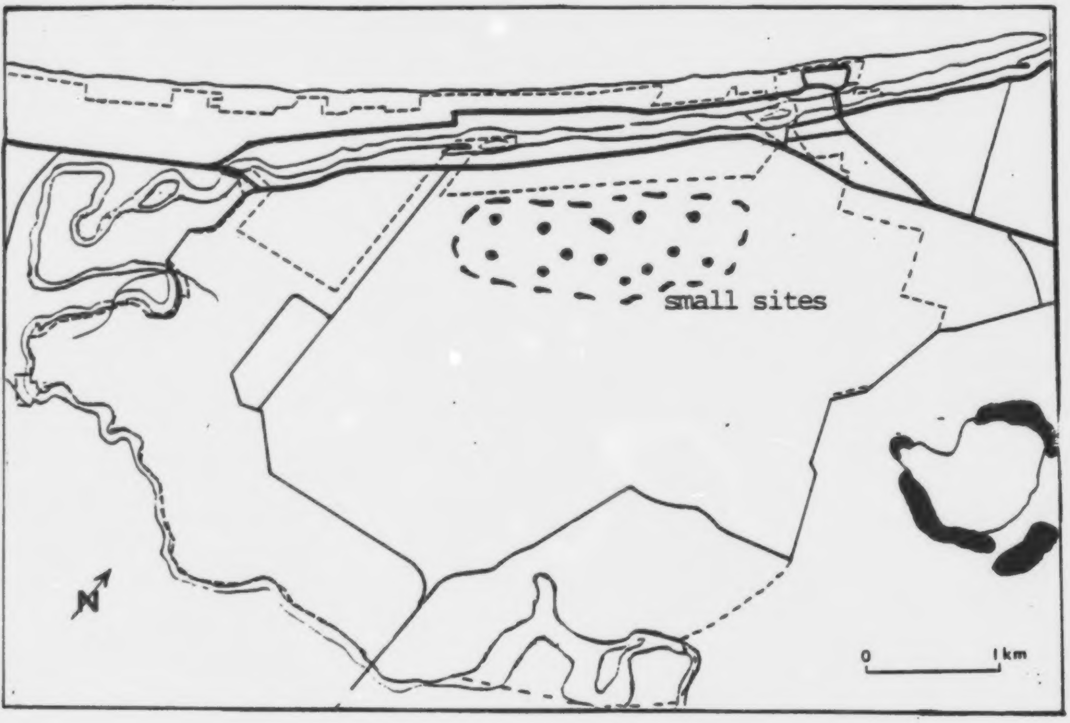
Agrimonia gryposepala
Thalictrum pubescens
Solidago rugosa
Galium trifidum
Carex eburnea
Viburnum opulus var.americana

Further considerations : A common vegetation in the Site District (Hanna 1984) with little life science significance within itself.

Vegetation Type 14 : Wet Meadows
(Figures 38,39,40 and 41)

Site : Numerous small sites in saturated to wet sand-based cooler swales amongst the beach ridges support this vegetation, as well as wet to saturated, normal to cooler sand and organic/marl substrates in the Marl Lake area and along the Nottawasaga River.

Figure 38 : Type 14 - Wet Meadows



Characteristics : occurs as small, graminoid-dominated pockets in natural situations in lowland forest in the raised beaches (Figure 39) or as extensive grass and sedge flats along gently sloping shores. The flora is diverse in such sites. These stands are early successional and become intolerant lowland forest or wet thickets if environmental conditions, especially hydrology, change.

The fen-like marl meadows along the shore of Marl Lake are natural associations of plant species with strong affinities to the shoreline communities found along the Lake Huron shoreline in Simcoe, Gray and Bruce Counties. They are not represented in ANSI areas or parks in Site District 6-6 (Hanna 1984), except for a tiny area of Awenda Provincial Park.

The vegetation associations recorded from this Type (see Figure 8) are as follows :

14a) *Scirpus americanus*^{6} - *Lythrum salicaria*^{3} - *Leersia oryzoides*^{1}
(Powerline Road at Nottawasaga River - north)

14b) *Equisetum variegatum*^{6} - *Scirpus americanus*^{2} - *Juncus balticus*^{2}
(New Wasaga Beach)

14c) *Onoclea sensibilis*^{4} - *Glyceria borealis*^{3} - *Carex rostrata*^{2} - *Thelypteris palustris*^{1}
(raised beaches near north end of park)

14d) *Carex lasiocarpa*^{8} - *Scirpus acutus*^{1} - *Typha latifolia*^{1}
(south end Marl Lake)

14e) *Eriophorum viridi-carinatum*^{6} - *Carex flava*^{2} - *Scirpus acutus*^{2}
(south end Marl Lake)

14f) *Scirpus acutus*^{8}- *Carex lasiocarpa*^{2}
(south end Marl Lake)

14g) *Carex lasiocarpa*^{9} - *Carex flava*^{1}
(south end Marl Lake)

14h) *Carex lasiocarpa*^{9} - *Typha latifolia*^{1}
(south end Marl Lake)

14i) *Solidago ohioensis*^{5} *Carex lasiocarpa*^{3} - Cedar seedlings^{1} -*Salix candida*^{1}
(south end Marl Lake)

Figure 39 : Wet grassy meadow in raised beaches swale near north end of the park (Type 14)

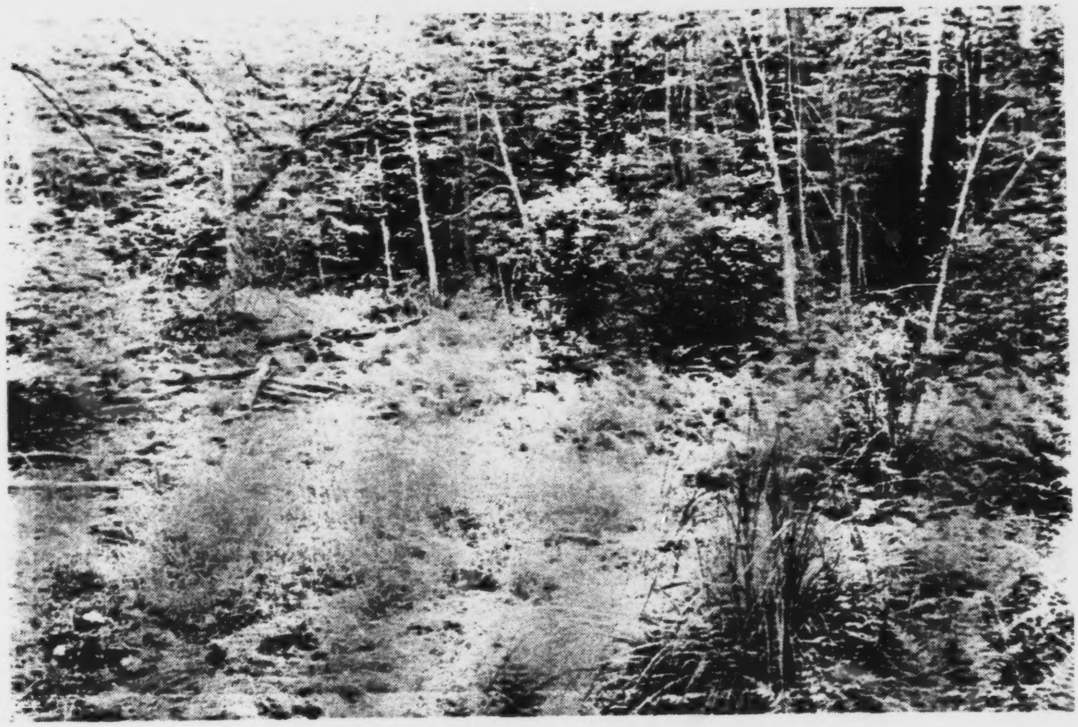


Figure 40 : *Carex lasiocarpa* - *Scirpus acutus* - *Salix candida* marl meadow at Marl Lake (Type 14)

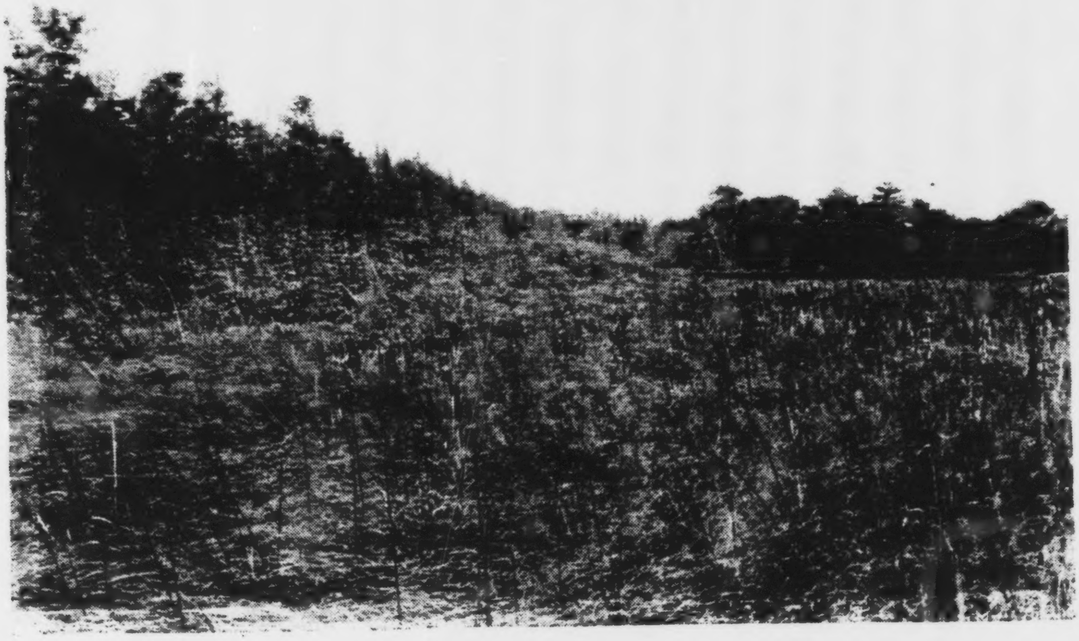
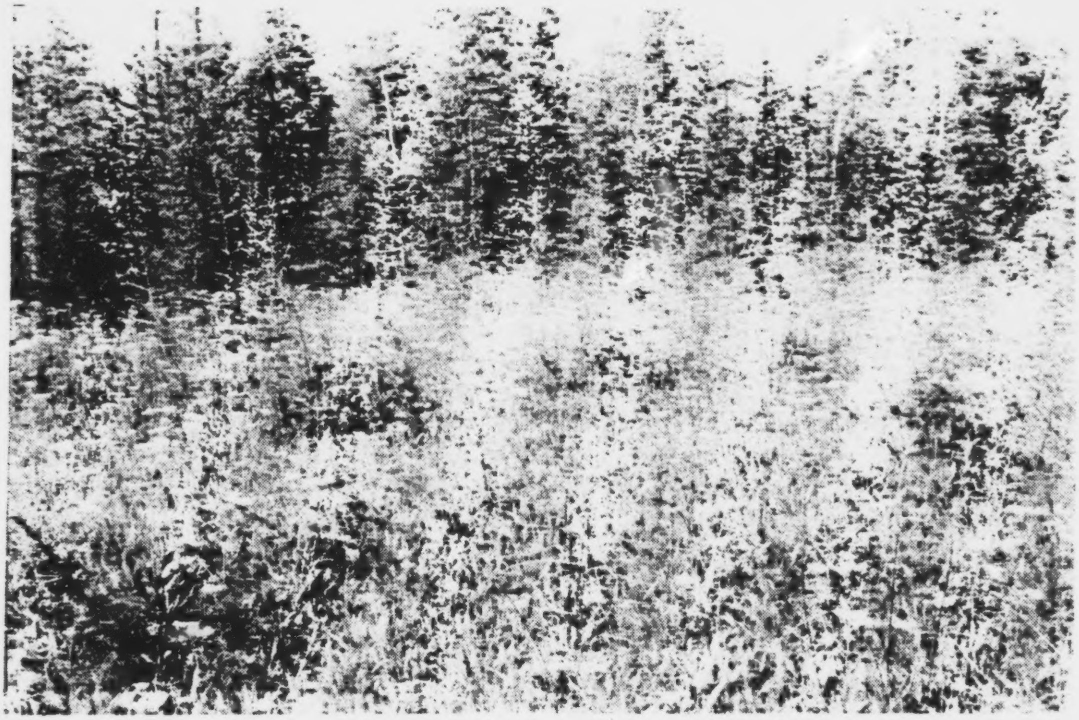


Figure 41 : Solidago ohioensis-Carex lasiocarpa - Cedar seedling marl meadow at Marl Lake (Type 14)



Typical ground flora includes :

Galium palustre
Carex cristatella
Thelypteris palustris
Lythrum salicaria
Eupatorium perforatum
Carex lasiocarpa
Scirpus acutus

Iris versicolor
Carex rostrata
Carex hystericina
Leersia oryzoides
Calamagrostis canadensis
Solidago ohioensis
Eriophorum viridi-carinatum

Further considerations: The small sites within Wasaga Beach Park are transitory in nature, being succeeded by a variety of lowland vegetation. A similar situation exists at the larger area of this vegetation type west of Marl Lake. These areas are of limited life science significance.

The fen-like marl meadows along the southern, western and northern shores of Marl Lake, however, are highly significant.

They are relict associations from Lake Nipissing shorelines (see Geology and Geomorphology, page 7). That situation, in combination with the presence of the nationally rare sedge *Eleocharis rostellata*, the regionally significant plants *Carex livida* and *Geum laciniatum* and numerous locally significant species, indicates the high degree of life science importance of this vegetation type.

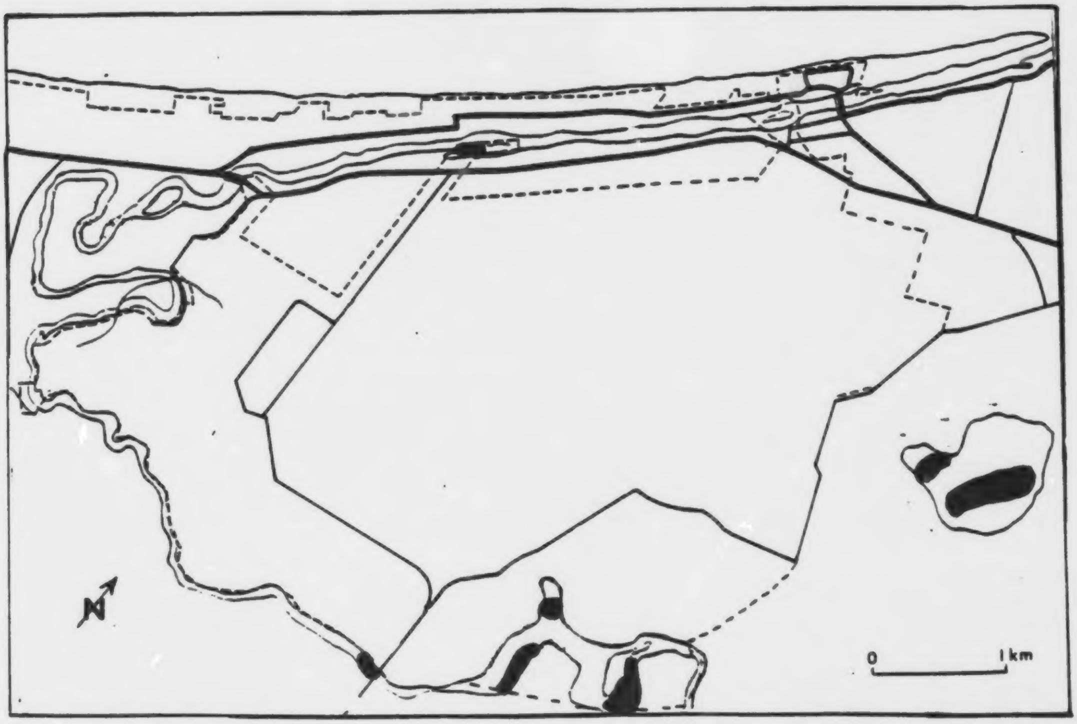
Vegetation Type 15 : Mixed(Emergent and Floating) Marsh

(Figure 42)

Site : Occurs in shallow, quiet open water over sand or marl in calcareous water in cooler situations.

Characteristics : Vegetation cover is composed of a diversity of species and varies from highly dispersed in Marl Lake to thickly crowded at Jacks Lake. Small stands occur virtually wherever permanent water occurs, except along the surf-pounded wet sand beach of Nottawasaga Bay.

Figure 42 : Type 15 - Mixed (Emergent and Floating) Marsh



Vegetation associations recorded from this Type (see Figure 8) are as follows :

15a) *Potamogeton illinoensis*^{4} - *Chara*(algae)^4 - *Najas flexilis*^{2} -*Scirpus validus*^{2} (Marl Lake)

15b) *Nymphaea tuberosa*^{5} - *Elodea canadensis*^{4}- *Pontederia cordata*^{1} (N arm Jacks Lake)

Typical flora includes :

Ceratophyllum demersum
Elodea canadensis
Lemna minor
Sparganium americanum
Zosterella dubia
Potamogeton richardsonii
Potamogeton illinoensis
Eleocharis acicularis

Further Considerations : Common Vegetation Type across southern Ontario, but often with unusual floristic elements. The sparse vascular flora of Marl Lake is unusual in the Site District (Hanna 1984). The regionally significant aquatic *Hippurus vulgaris* and a number of locally significant species are known from this vegetation.

Vegetation Type 16 : Shallow Marsh

(Figures 43 and 44)

Site : Saturated to shallow water sites in cooler to normal microclimates on marl and silty-sand substrates along the Nottawasaga River and at Marl Lake. Also found in tiny sites along the bay shore, in roadside ditches and other permanently flooded sites.

Characteristics : Cat-tail marsh is a typical example of this Type, mixed with tall *Scirpus* and other emergent aquatic species. Such stands occasionally include scattered clumps of wetland shrubbery and wetland forest and occur adjacent to other wetland Vegetetation Types, including fens and swamps. Succession leads to shrub and lowland forest Types. Species diversity varies from low in dense *Typha* stands to high in wetter, mixed *Scirpus* - *Typha* stands.

The associations recorded from this Vegetation Type (see Figure 8) are as follows :

16a) *Typha latifolia*^{7}-*Phragmites australis*^{3} (Marl Lake)

16b) *Scirpus validus*^{6} - *Carex lasiocarpa*^{2} - *Typha latifolia*^{2} (Marl Lake)

16c) *Typha latifolia*^{5} - *Calamagrostis canadensis*^{5} (Nottawasaga River near Jacks Lake)

Figure 43: Type 16 - Shallow Marsh

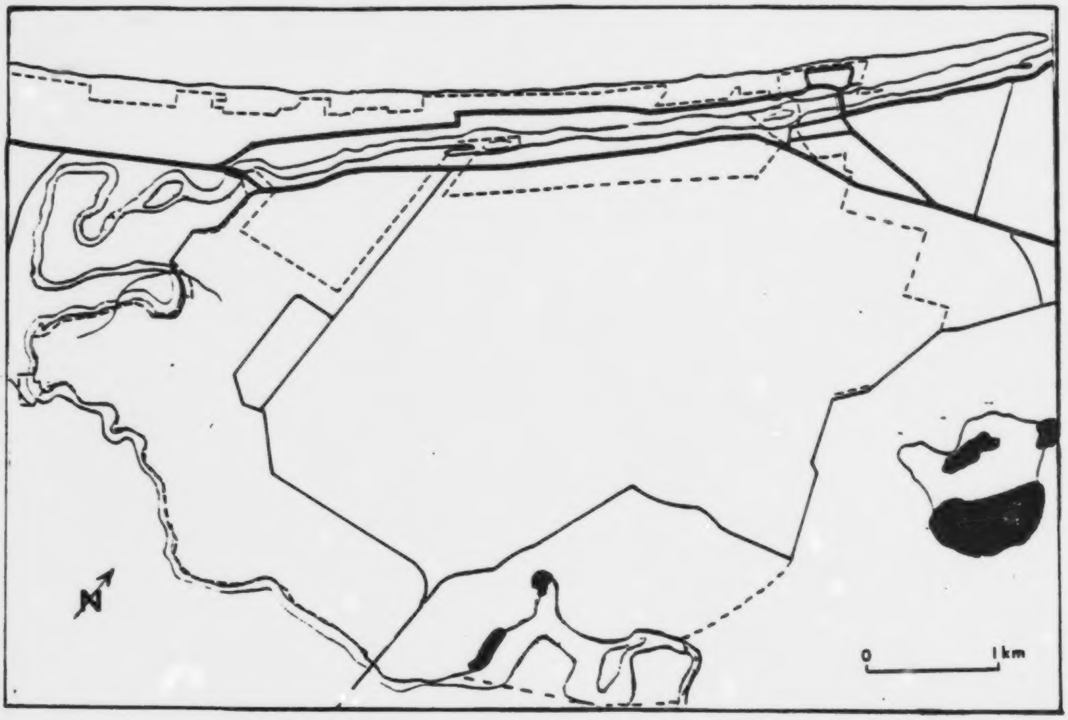


Figure 44: *Scirpus validus* - *Typha latifolia* marsh at Marl Lake (Type 16)

Typical species include :

Leersia oryzoides	Bidens cernua
Nymphaea tuberosa	Calamagrostis canadensis
Lemna minor	Lythrum salicaria
Sium suave	Iris versicolor
Cladium mariscoides	Mimulus ringens
Cicuta bulbifera	Carex retrorsa
Eupatorium perfoliatum	Epilobium ciliatum

Further Considerations : This Type is widely spread in the Site District and across southern ontario and is not particularly significant in the study area; no regionally significant flora was observed in marsh vegetation here.

Vegetation Type 17 : Graminoid Fen (Figures 45 and 46)

Site : On cooler, saturated, organic substrate over marl north of Jacks Lake; peat depth is ca. 1 m (ph 6.5 to 7.0); succeeding slowly to swamp thickets and lowland coniferous forest.

Figure 45 : Type 17 - Graminoid Fen

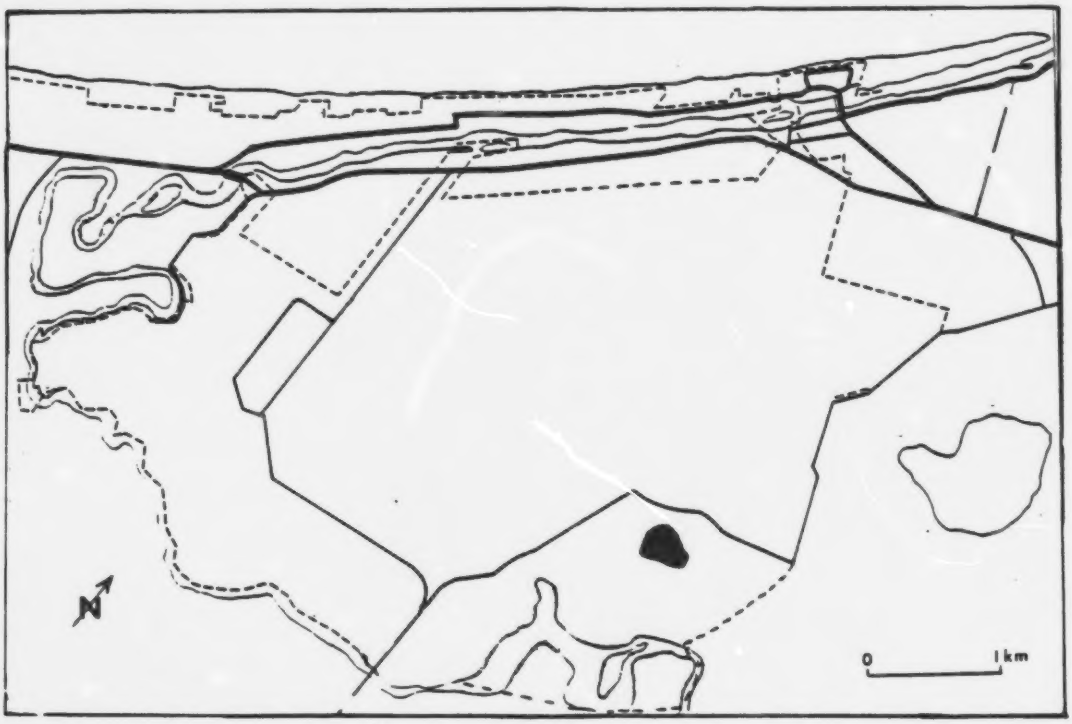


Figure 46 : Carex lasiocarpa - Phragmites australis - Sarracenia purpurea fen meadow clearings in Jacks Lake fen (Type 17)

The vegetation association recorded from this Type (see Figure 8) is as follows:

17a) Carex lasiocarpa[6] - Smilacina trifolia[1] - Thalictrum pubescens - Solidago uliginosa[1] - Senecio aureus[1] (Jacks Lake fen)

Characteristics : A wide variety of peatland calcicoles dominate this Type, with Carex lasiocarpa being an important graminoid element and Cedar seedling being important shrub elements (with willows). The ground flora is rich in species with northern affinities and widespread peatland taxa.

Typical species include :

Sarracenia purpurea
Triglochin maritima
Carex limosa
Solidago uliginosa
Selaginella eclipes
Carex diandra
Galium labradoricum
Utricularia intermedia
Spiranthes romanzoffiana
Drosera rotundifolia
Carex livida
Carex interior
Lobelia kalmii
Muhlenbergia glomerata
Salix serissima
Epilobium leptophyllum
Juncus brachycephalus
Senecio aureus
Potentilla palustris
Eleocharis elliptica

Further considerations : This is a highly significant Vegetation Type; it is rare in the Site District (Hanna 1988) and contains many locally rare plant species as well as the regionally rare Carex livida and two provincially (nationally ?) rare insect species.

3) FLORA

The floristic diversity of the Wasaga Beach Provincial Park study area is great, due in part to the variation in habitats found here and to the complex geomorphological history of the area (see discussion commencing on page 7). Over 670 taxa of vascular plants were observed within the limits of the Wasaga Beach Provincial Park study area. A large number (ca. 70 species) have been recorded in the immediate vicinity of the study area (Bobbette 1975) and many of these could likely occur within that area as well.

Appendix 1 (page 115) lists all the taxa which have been documented in the park study area and/or observed during this study.

The flora includes many species of native and introduced plants that are widespread in southern Ontario and beyond. A significant number, however, reflect affinities of the Wasaga Beach area with floras of more distant areas. These taxa, some of which are quite rare here, likely owe their presence to prehistoric events; some at least are relicts from periods in the past when the Wasaga Beach environment was much like conditions today in those distant areas. Examples of such floristic affinities are noted below.

a) NORTHERN AND NORTHWESTERN

A large number of species found in the fens, along the lake shores and in other wetland sites (primarily) are found today in areas across the Boreal Forest Region of Ontario (and/or Canada). Some are predominately found in western Canada. Such species may have originated in the study area during the early years of the area's final emergence from the postglacial great lakes. Many would likely have constituted elements of the flora on the boreal/ subarctic landscape surrounding the study area for several thousand years following deglaciation (ca. 11,000 to 9,000 years B.P.). These species include :

Trisetum melicoides
Oenothera oakesiana
Carex gynocrates
Carex capillaris
Scirpus hudsonianus
Goodyera oblongifolia
Carex livida
Tofieldia glutinosa
Sparganium minimum
Dichanthelium boreale
Calypso bulbosa
Parnassia parviflora
Festuca saximontana
Galium labradoricum
Triglochin palustre
Anemone multiflora

b) GREAT LAKES SPECIALTIES

A number of species that are known in Ontario only from the shores of the Great Lakes, or are confined primarily to such a distribution, are also found along the seashore in northeastern North America or have very close relatives exhibiting such a distribution. These plants have been loosely called specialties of the Great Lakes shores. Two (Cirsium hillii and Solidago ohioense) are endemic to this area.

Examples of this group include :

Cirsium hillii
Lathyrus japonicus
Prunus pumila var. pumila
Solidago ohioensis
Cakile edentula
Ammophila breviligulata

Some of these taxa may date from the period ca. 8,000 to 6,000 years B.P. when the connection between the postglacial great lakes and the maritime environment of the eastern coast was much narrower than it is today. These species are all dune and beach plants, habitats little changed since that prehistoric time.

c) SOUTHERN SPECIES

The more temperate conditions now widespread in southeastern Canada have been in place for over 6,000 years and it is likely that many of the species of plants with southern affinities now found in the Wasaga Beach area did not occur here before that time. The relatively rapid revegetation of the landscape would have encouraged the success of fast colonizers. The presence of many graminoids in this southern group may reflect that situation. The warmer, drier period that peaked in this part of North America about 5,000 years B.P. likely encouraged these species as well as plants now typical of the drier, tall-grass prairie areas of east-central North America.

Species that demonstrate this southern and/or southern-prairie affinity include the following :

Chimaphila maculata
Eragrostis frankii
Cyperus houghtonii
Lithospermum carolinense
Muhlenbergia schreberi
Aster urophyllus
Juniperus virginiana
Panicum virgatum
Helianthemum canadense
Sorghastrum nutans
Andropogon gerardii
Hieracium gronovii
Carex foenea
Carex muhlenbergii
Carex grayii
Hamamelis virginiana
Sporobolus cryptandrus
Lycopodium obscurum var. obscurum

d) INTRODUCED SPECIES

The most recent and most dramatic influence of the vegetation and flora of Wasaga Beach Provincial Park has been the works of man. Direct impact by development and indirect impact through management practices have affected the landscape. So too, and to a very large degree, has the intentional and incidental introduction of non-native plant species. Some result from escapes of species planted for agricultural purposes and as weeds associated with the original source of such agricutural material. Others are escapes from vegetable and flower gardens, persisting and slowly spreading from a point of origin or widely distributed from well established populations. The incidental introduction of 'weeds' from international trade goods accounts for many of these new species as does the development and management practices associated with automobile travel routes.

Examples of these species now found in the Wasaga Beach area include :

Centaurium erythraea
Juncus compressus
Taraxacum officinale
Phleum pratense
Epipactis helleborine
Asparagus officinale
Sporobolus vaginiflorus
Agropyron repens
Trifolium spp.
Veronica arvense

4) FAUNA

There were insufficient resources to evaluate the faunal values and features of the study area to the same degree to which floral and vegetational resources were examined. Faunal data were gathered in conjunction with botanical/ecological investigations and also assembled from the existing literature.

a) BIRDS

The ca. 230 species of birds recorded from Wasaga Beach Provincial Park and Marl Lake are listed in Appendix 3. The vast majority are typical of the larger south Georgian Bay - Simcoe County area, reflecting those most favoured by dry, sandy, coniferous and young mixed upland forest vegetation (Devitt 1968; Godfrey 1986; Cadman et al. 1987). Many are widespread species of southern Ontario that begin to become less frequent not far to the north of the park area when the sedimentary lowlands are replaced by Precambrian Canadian Shield. Examples of this group would include Field Sparrow, Rufous-sided Towhee, Rough-winged Swallow and Black-billed Cuckoo. Others reverse the pattern, being widespread on the Canadian Shield and becoming rare as breeding species south of there. These include Blackburnian Warbler, Hermit Thrush, Dark-eyed Junco, Purple Finch and Broad-winged Hawk.

The influence of Georgian Bay and the Great Lakes is very important, not just as a landscape forming vehicle but also as habitat. A number of aquatic birds regularly use the off shore as feeding grounds and thousands migrate along its shores each spring and fall. Common and Caspian Terns, Common Loons, Herring and Ring-billed Gulls are regularly seen here.

The bird fauna here has been studied relatively intensively since the 1920's and a number of important early discoveries were made and observations documented (Harrington 1914; 1915; 1916; 1922; 1924). The Wasaga Beach area figures largely in the treatment of birds of this area (Devitt 1967). Subsequent development along critical beach habitat, however, has greatly reduced the significance of the avifauna in the park and succession may have similarly limited values at Marl Lake.

b) MAMMALS

Appendix 4 lists the 44 species known to occur within range here, though all 44 almost certainly are not present due to habitat limitations, etc. (Peterson 1968). All are typical species of the general southern Ontario - south Georgian Bay area.

c) REPTILES AND AMPHIBIANS

Appendix 5 lists the species within range at Wasaga Beach (Cook 1984; Oldham and Sutherland 1984; Oldham et al.1988; Plourde et al. 1988). All were considered typical of the the general area.

d) OTHERS

Scattered, opportunistic observations of insects and other in invertebrates were made during this study; significant observations are reported in Chapter 3 : Significant Features.

CHAPTER 3 : SIGNIFICANT FEATURES

The following chapter considers life science resources deemed to be of particular significance. Resources not mentioned here are discussed elsewhere in the text (especially in Chapter 2) and are important as typical elements of the study area. Accordingly, the reader should not assume that features not described in Chapter 3 are insignificant.

The life science significance of features and values is discussed in objective terms first, irrespective of their potential cultural, economic or recreational importance. Such considerations are accommodated in discussion of management options and concerns.

Significance is evaluated in terms of the representative value of the feature at a local, regional or provincial scale and the rarity of that feature .

1) SIGNIFICANT VEGETATION

The representational value of Vegetation Types is the prime consideration for evaluating significance. As well, vegetation that is not particularly unusual or exemplary but which supports a variety of important other values (e.g. rare flora and fauna) is considered in the Significant Areas discussion (below).

There are four Vegetation Types in the Wasaga Beach Provincial Park study area that are considered to be significant. They are as follows :

UPLAND INTOLERANT CONIFEROUS FOREST (Type 5)

The Red and White Pine forest dominating the geomorphologically important parabolic dunes and the higher sections of the transverse dunes offer excellent examples of relatively natural pineries in warmer sites. Only in Awenda Provincial Park are there comparable examples of this vegetation in Site District 6-6 and it is present there in much smaller amounts.

As the best example of this important Vegetation Type in the Site District, it is considered Provincially Significant.

UPLAND TOLERANT CONIFEROUS FOREST (Type 6)

Such Cedar and Cedar - Hemlock areas are typical of the wet-mesic shoreline areas along Georgian Bay but have become fragmented and disturbed by human disturbance. Hanna (1984) describes no areas like this in Site District 6-6 outside of Wasaga Beach Provincial Park. Rogers (1978) suggests that such Hemlock populations are genetically distinct from upland forms and are largely confined in Ontario to the Georgian Bay shoreline.

As the best example of this Vegetation Type in the Site District it is considered Provincially Significant.

UPLAND SAND BARRENS (Type 7)

None of the ANSIs in Site District 6-6 support a large area of this Vegetation Type. The Georgina Beach significant area north of Wasaga Beach Provincial Park mentioned in Hanna (1984) and areas in private ownership near Spratt Point also to the north (A.A. Reznicek, pers. comm.) support limited extents of natural or reasonably natural beach sand barren. The Wasaga Beach Provincial Park dune sand barrens are unmatched in the Site District and are rare in Ontario (Carlisle et al. 1972; Van der Meer et al. 1978).

This is the best example of the Vegetation Type in the Site District and one of the few in Ontario and is considered to be Provincially Significant .

UPLAND MEADOWS AND THICKETS (Type 8)

The native sand prairies of the high dunes, like the sand barrens described above, are unmatched elsewhere in the Site District and are rare in Ontario. This does not apply to the regenerating meadows that result fron agricultural development along the Nottawasaga River, however.

Accordingly, the native prairies in this Vegetation Type as the best example in Site District 6-6 and one of the few in Ontario (Hanna 1984; Carlisle et. al. 1972; Van der Meer 1978), must be considered to be Provincially Significant.

WET MEADOWS (Type 14)

The fen-like marl meadows at Marl Lake are unique in the study area. They are relict associations presisting from postglacial Lake Nipissing shorelines - much like those along the Lake Huron shore north and west of the park area today. These meadows are not represented in Site District 6-6 ANSIs (Hanna 1984). They are being severely reduced by residential development in the Collingwood area (and elsewhere ?). This vegetation is considered to be Provincially Significant.

2) SIGNIFICANT FLORA

The following provides a more detailed discussion of the particularly important plant species that are found in the Wasaga Beach Provincial Park study area. A listing of all species, with page references to the discussions for each significant taxon, is included in Appendix 1.

The levels of floristic significance are as follows:

NATIONAL - Listed in Argus et al. (1982-1987) as rare in Canada; all are, accordingly, provincially rare as well.

REGIONAL - Listed in Riley (1989) as rare in Simcoe County.

LOCAL - Significant in the Wasaga Beach Provincial Park study area, and its immediate vicinity.

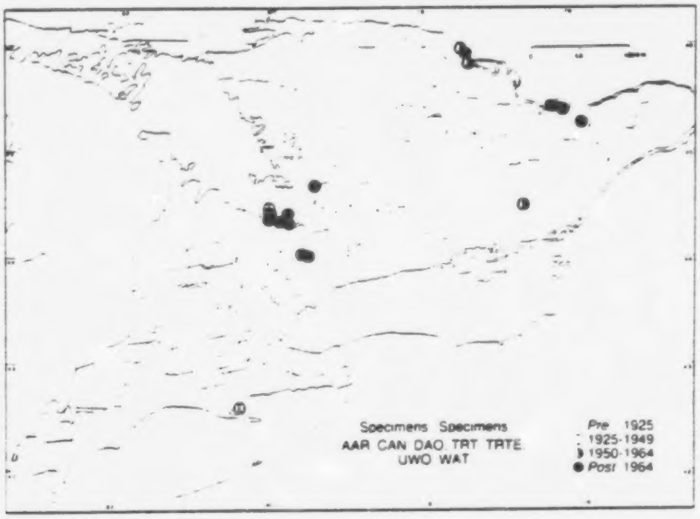
a) NATIONALLY SIGNIFICANT FLORA

1) Cyperus houghtonii
2) Eleocharis rostellata
3) Chimaphila maculata
4) Cirsium hillii

1) Cyperus houghtonii (Houghton's Cyperus) (Figures 47,48 and 49)

Ball and White (1982A) note that this sedge is widespread in southern Ontario, being confined mostly to the southern Georgian Bay and Ottawa Valley areas. It is an open sand species and thrives

Figure 47 : Cyperus houghtonii in Ontario
(adapted from Ball and White 1982A)


Specimens Specimens
AAR CAN DAO TRT TRTE
UWO WAT
Pre 1925
1925-1949
1950-1964
● Post 1964

in disturbed sites. Indeed, it was observed to be common (50 - 150 plants) along the median of fire roads in the high dunes at Wasaga Beach Provincial Park (this study). The smaller stands (5 - 20 plants) occurred where the site had not been disturbed and this ineffective competitor was apparently losing ground to other more adaptable. species. Like other rare dune species (see Cirsium hillii), this sedge demonstrated its best growth and largest populations in area of light surface disturbance under the light shade of intact Red and White Pine cover -i.e. conditions produced in nature by a light (cool) fire.

Cyperus houghtonii was observed on the higher transverse dunes and the parabolic dunes areas in Wasaga Beach Provincial Park. The sites indicated in Figure 49 represent most but probably not all of the stations for this opportunistic and inconspicuous species.

Figure 48 : Cyperus houghtonii near The Oxbow, Nottawasaga River

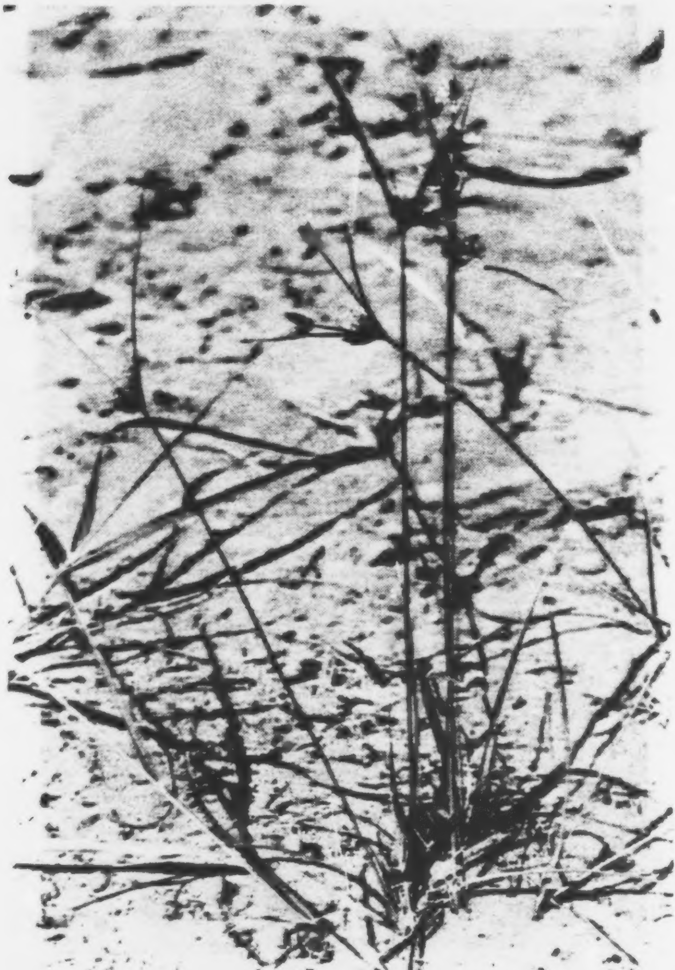
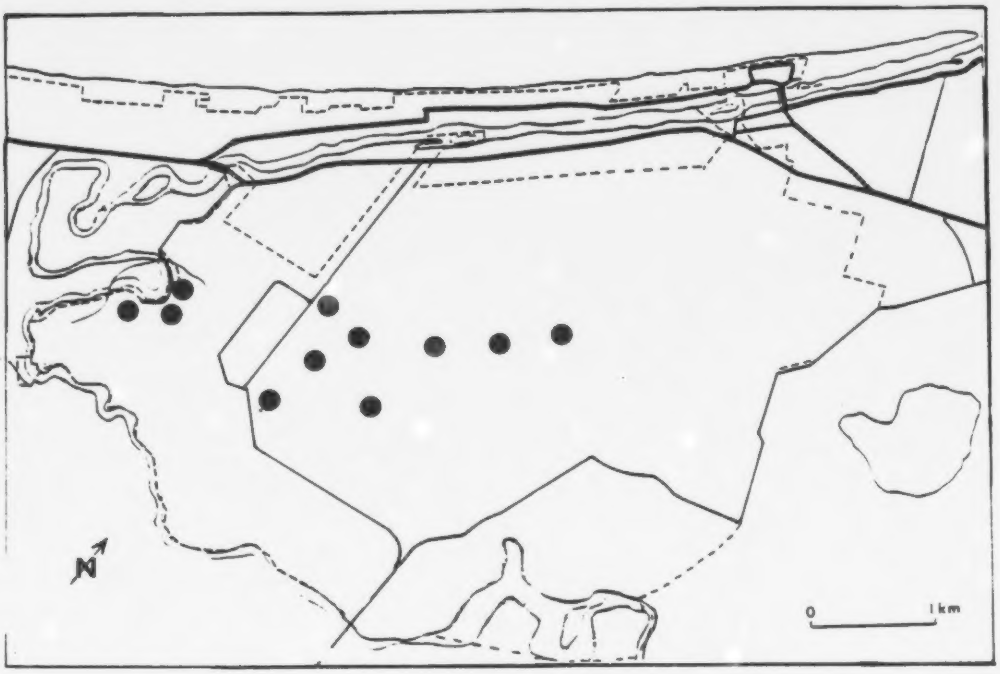


Figure 49 : Cyperus houghtonii in Wasaga Beach Provincial Park



2) Eleocharis rostellata (Beaked Spikerush) (Figures 50 and 51)

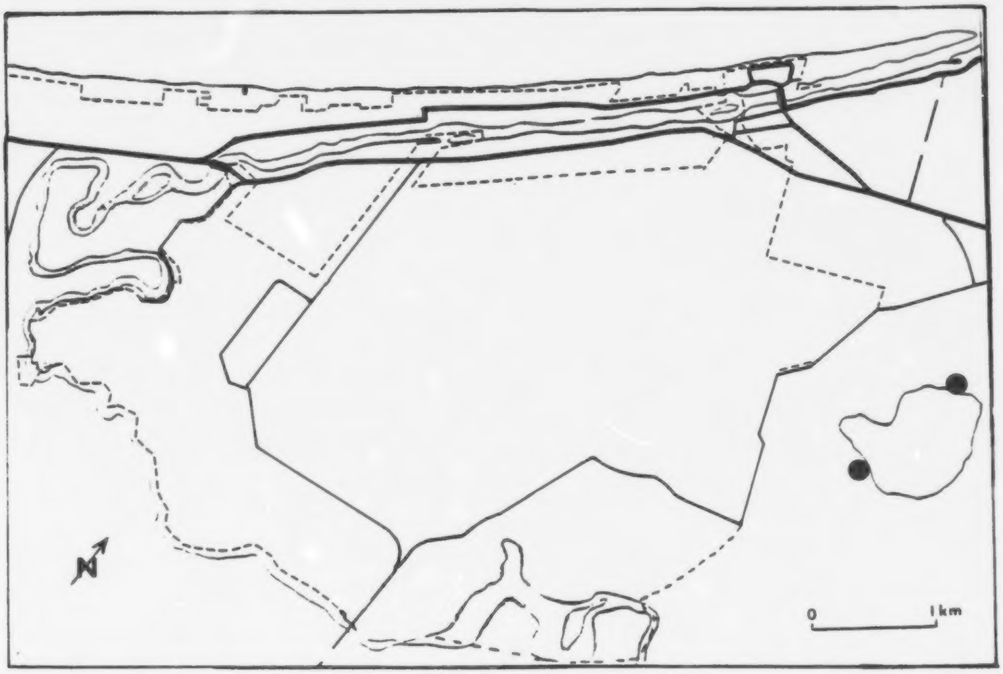
This is a species of calcareous shores, marl meadows and fens, found across the southern United States, the Atlantic coastal plain

Figure 50 : Eleocharis rostellata in Ontario
(Ball and White 1982B; this study)

and across the Great Lakes region; it occurs in Canada in British Columbia and Nova Scotia as well (Ball and White 1982B). Where the species is found it is often locally abundant (e.g. at Minesing Swamp, Simcoe County and Stoco Fen Nature Reserve Park, Hastings County).

Small populations (less than 100 plants) were observed at the north end of Marl Lake (*D.F. Brunton 8140*) and the south end of Marl Lake (*D.F. Brunton 8543*) in open fen-like marl meadows (Type 14).

Figure 51 : *Eleocharis rostellata* in the Wasaga Beach Provincial Park study area



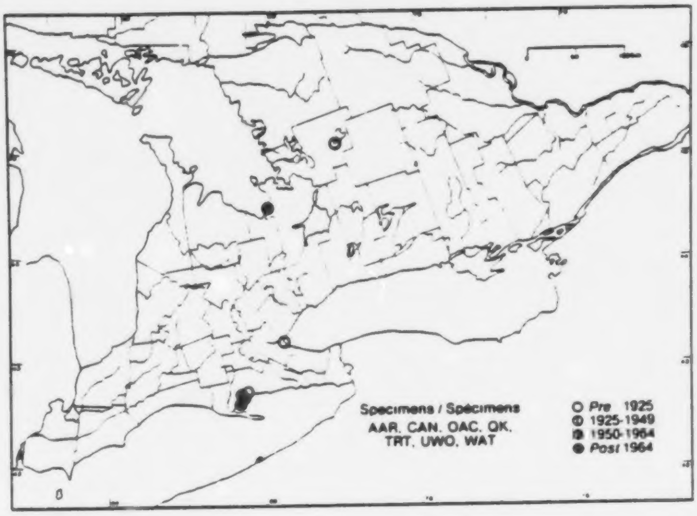
The specimens at the north end of the lake were sterile while those in the more diverse meadow community at the south contained mature fruits. The plants were not observed to root at the tips of arching culms, as is typical (and virtually diagnostic) for this species elsewhere (e.g. Stoco Fen Provincial Nature Reserve Park - pers. obs.).

There are three other Simcoe County records for this sedge (Riley 1989; Ball and White 1982B).

2) Chimaphila maculata (Spotted Wintergreen) (Figures 52, 53,54 and 55)

The distribution of this small evergreen shrub along the northern edge of its range is very curious. Canadian stations are small and scattered (all in Ontario) and only near Long Point, Lake Erie is more than a handful of plants known (Gartshore et al. 1987; Kirk 1986).

Figure 52 : Chimaphila maculata in Ontario (Haber and Keddy 1984)



Although known in Canada since the mid 1800's (Macoun 1884, 1890), most earlier stations in the Toronto - Lake Erie area are no longer extant (Kirk 1986).

Spotted Wintergreen was discovered at Wasaga Beach Provincial Park in the fall of 1975 by park naturalist Peter Van Stam. He later showed the one small stand to A.A. Reznicek and R. Bobbette. A specimen consisting of 3 small, sterile plants (about half of the total observed - P. Van Stam, pers. comm.) was collected and deposited in the park herbarium. The site (Figure 54) is in Lot 11, Concession 17 of Sunnidale Township. The plants were found in a mesic depression under Red Oak - Red Maple - White Pine cover in the transverse dunes section of the park (Figure 55), growing in a rich ground flora that includes Platanthera hookeri and Lycopodium obscurum var. obscurum populations (personal observations). Three searches in 1988 failed to discover any of these plants. D.A. Sutherland (in Gartshore et al.

Figure 53: *Chimaphila* *maculata* in flower (photographed in Eastham, Massachusetts; 1988)

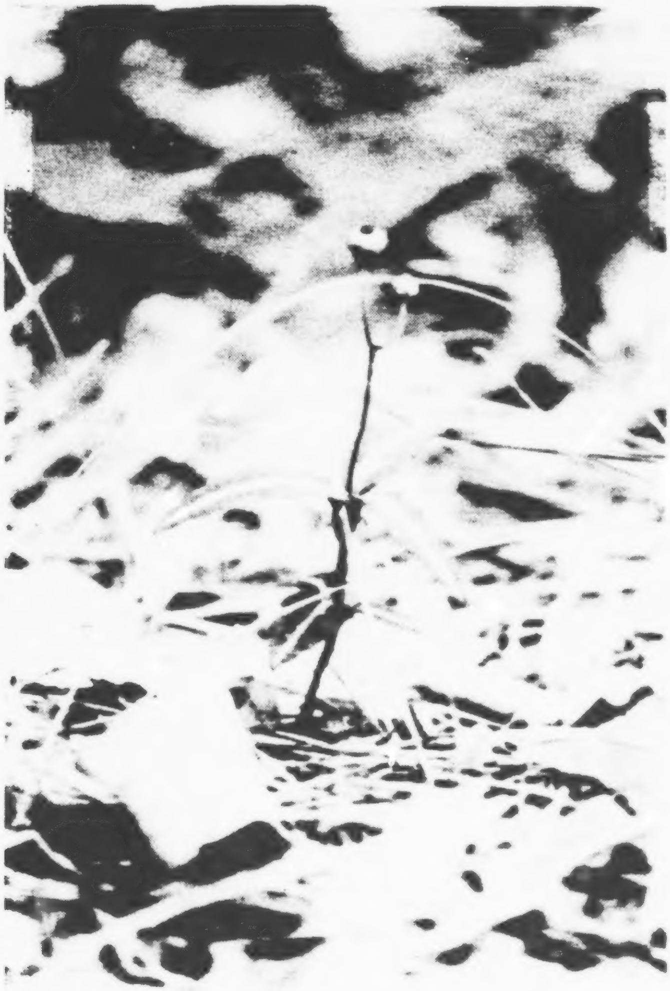


Figure 54 : Chimaphila maculata in Wasaga Beach Provincial Park

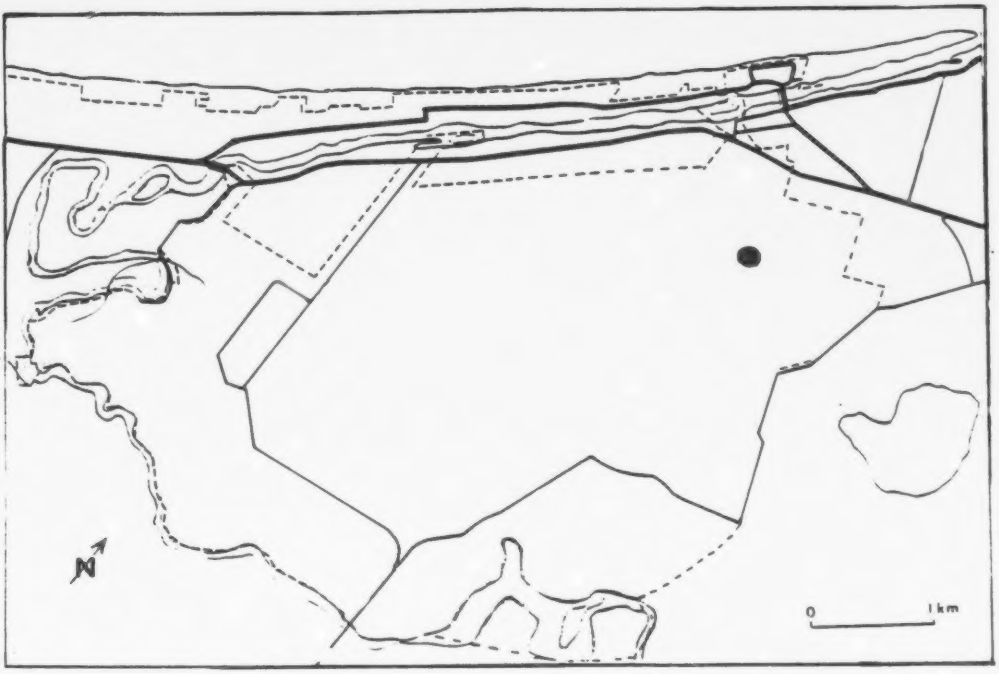


Figure 55 : Site of Chimaphila maculata in north end of Wasaga Beach Provincial Park

1987) notes that C. maculata populations in the Norfolk County area can change dramatically from year to year. Perhaps the Wasaga Beach population is present but in low numbers in 1988, due to the drought experienced in this area in 1987 and 1988.

Chimaphila maculata was declared an Endangered species in Canada in October 1986 by the Committee on the Status of Endangered Wildlife in Canada (Gartshore et al. 1987).

4) Cirsium hillii (Hill's Thistle) (Figures 56, 57 and 58)

This member of the aster family is endemic in the Great Lakes region, with a closely allied species (or subspecies - cf. Moore and Frankton 1974) extending towards the Atlantic coast. Its entire Canadian range, accordingly, is within Ontario - all records being from Lake Huron (White and Maher 1983). Only about half a dozen stations, all representing only a few plants each, are known in Ontario.

The Wasaga Beach Provincial Park stations are all very small (usually one plant) and consist of mostly sterile plants. No fertile plants were observed during this study. All park stations are in the parabolic dunes area, although at least one station was once known near the Nottawasaga Bay shore in the 1970's (A.A. Reznicek, pers. comm.).

Figure 56 : Cirsium hillii in Ontario (from White and Maher 1983)

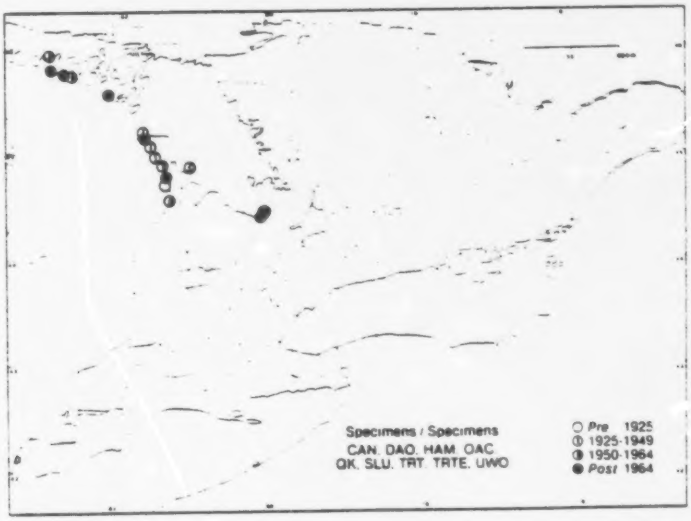


Figure 57 : Cirsium hillii in Wasaga Beach Provincial Park

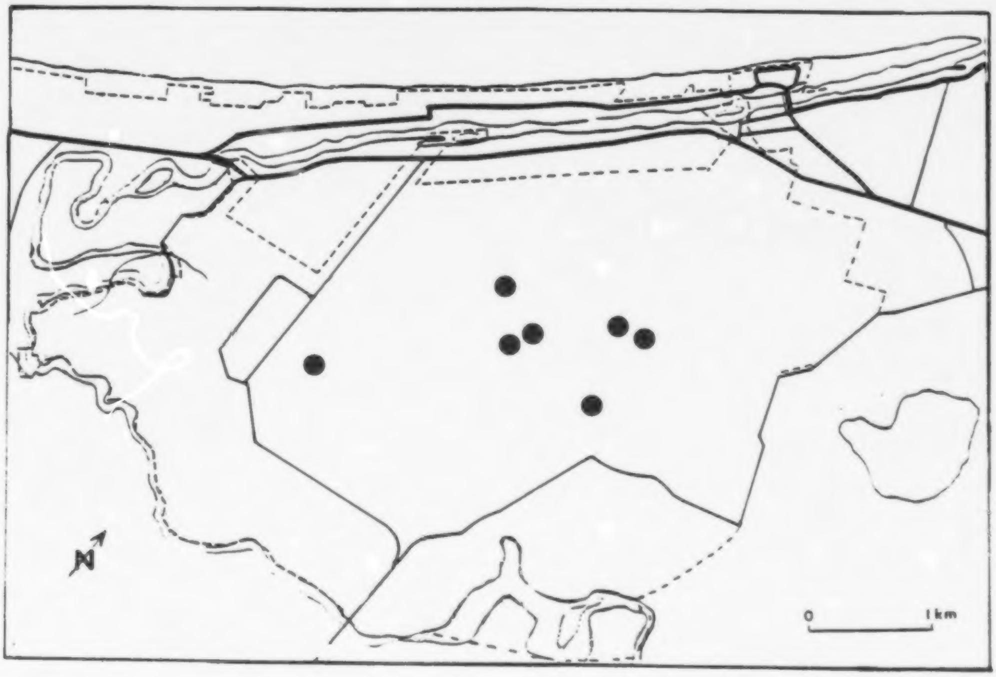
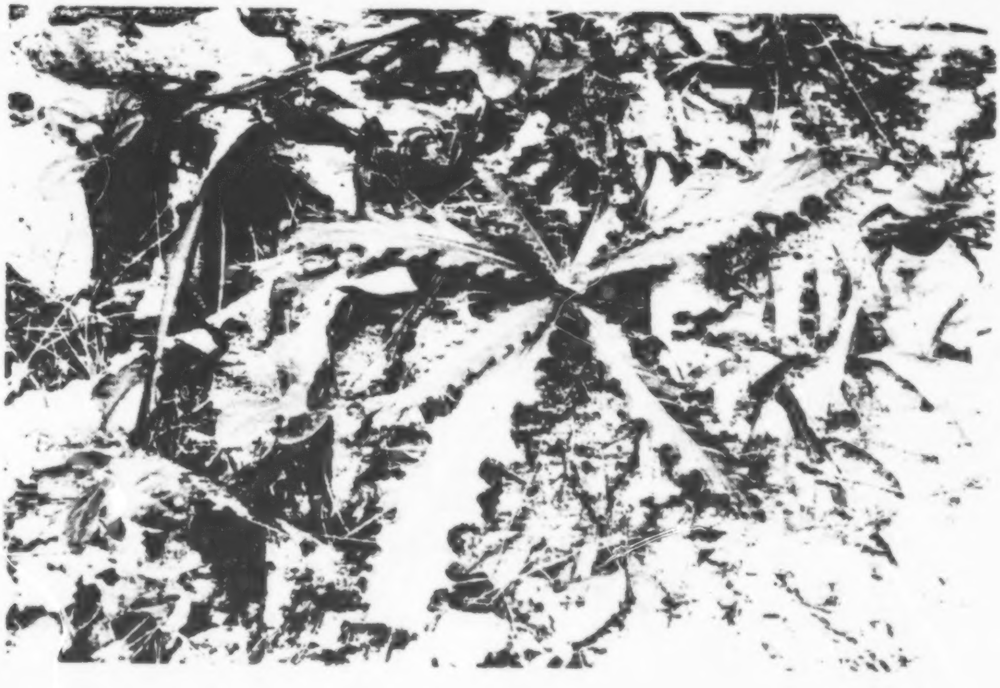


Figure 58: Sterile rosette of Cirsium hillii in the high dunes



It is believed to have been destroyed by recreational development. The plants seen in 1988 were all growing singly and all were on the stabilized edge of fire roads through the dry forests of the high dunes (Figure 58), growing with Carex pensylvanica, Gaultheria procumbens, Ceanothus herbaceus and Comptonia peregrina under Red Oak - pine forest cover. The slight surface disturbance was like that of Cyperus houghtonii sites (see page 58), but experienced more shade. In other words, it appears that C. hillii also requires disturbance to the forest duff, but a sufficiently light disturbance to expose and prepare the soil without damaging the shade cover. A light (cool) natural fire would provide such a level of disturbance in this habitat in the past.

Although C. hillii has not been considered by the C.O.S.E.W.I.C. subcommittee, the existence of so few recent records of this endemic taxon suggests that they would find it be either Endangered or Threatened in Canada. While it continues to grow in Wasaga Beach Provincial Park, the stands are tiny and largely if not totally sterile, suggesting that C. hillii is not thriving here.

REGIONALLY SIGNIFICANT FLORA

5) Lycopodium Xhabereri
6) Lycopodium obscurum var. obscurum
7) Sparganium minimum
8) Potamogeton friesii
9) Alopecurus aequalis
10) Dichanthelium boreale
11) Eragrostis frankii
12) Festuca saximontana
13) Muhlenbergia schreberi
14) Sporobolus neglectus
15) Trisetum melicoides
16) Carex capillaris
17) Carex foenea
18) Carex grayii
19) Carex livida
20) Carex lucorum
21) Carex pallescens
22) Carex platyphylla
23) Carex umbellata
24) Maianthemum canadense var. interior
25) Calypso bulbosa
26) Goodyera oblongifolia x tesselata
27) Platanthera hookeri
28) Platanthera orbiculata var. orbiculata
29) Salix cordata
30) Amaranthus tuberculatus
31) Arabis drummondii
32) Cakile edentula
33) Hamamelis virginiana
34) Crataegus flabellata
35) Geum laciniatum
36) Oxalis stricta
37) Polygala polygama
38) Ceanothus americanus
39) Ceanothus herbaceus
40) Helianthemum canadense
41) Viola adunca
42) Oenothera oakesiana
43) Hippurus vulgaris
44) Halenia deflexa
45) Asclepias tuberosa
46) Agalinis tenuifolia var. parviflora
47) Hieracium gronovii

Regionally significant flora are those species recorded in Simcoe County six times or less, following the list of A.A. Reznicek, as reported in Riley (1988). Added are a few taxa (a hybrid and two varieties) not considered by Reznicek but believed to reflect the same distributional patterns as species on his list.

5) *Lycopodium Xhabereri* (=*L. digitatum* x *tristachyum*) (Haber's Clubmoss)

(New for Simcoe Co. ?) An uncommon hybrid in Ontario, found where the widespread *L. digitatum* and the local *L. tristachyum* grow together (e.g. Muskoka and Parry Sound Districts, Algonquin Provincial Park, etc. - personal observation).

A single stand was confirmed in the high dunes by a collection (Brunton 8209) determined by D.M. Britton (OAC). The plants were growing with both parent species along a fire road near the Lookout Dune in Red Pine (Type 5) forest.

6) *Lycopodium obscurum* var. *obscurum* (Southern Ground-cedar)

(New for Simcoe Co. ?) A southern and eastern taxon that was submerged within *L. obscurum* (s.lat.) until recently (Hickey 1977); uncommon across southern Ontario (almost exclusively off the Canadian Shield) in rich, sandy woods (Brunton 1984).

A single population was found at the *Chimaphila maculata* site (Brunton 8204A) in the transverse dunes at the north end of the park in Type 5 Red Oak - Red Maple - White Pine forest.

7) *Sparganium minimum* (Small Bur-reed) (Figure 59)

(5 Simcoe Co. records). A common northern (boreal) species of cool, wet, calcareous sites that is local and seldom seen in southern Ontario. Most southern sites consist of sterile plants (Brunton 1984). An exceptional number of new sites were found across southern Ontario in 1988 (personal observation), suggesting that the unusually dry conditions of this and last year were advantageous to this species - at least in the short term.

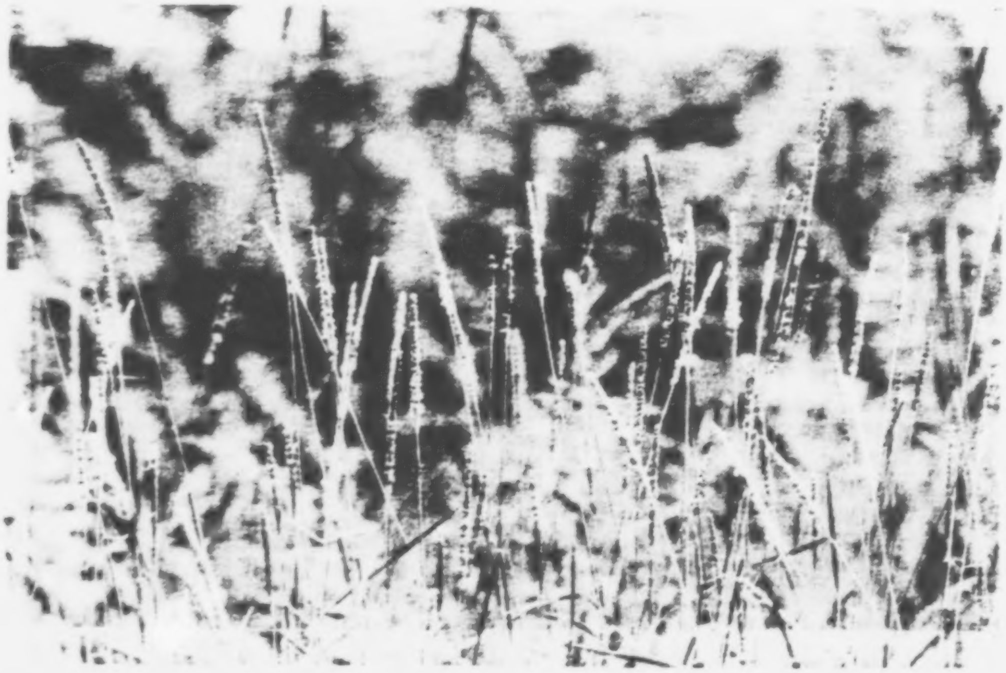
A large stand was found near the *Chimaphila maculata* stand (Brunton 8097) in a wet, cool swale in a Type 9 Black Ash swamp (Figure 57). Many plants in this stand were fruiting.

8) *Potamogeton friesii* (Fries's Pondweed)

(5 Simcoe Co. records) An uncommon species of quiet, calcareous water (especially clay substrates) that is approaching the northern limit of its range in southern Ontario here (a few stations, extending from its western North American range, are known from the Hudson Bay area - Hulten 1968).

Figure 59 : Sparganium minimum at the north end of the park in a Black Ash swamp

Figure 60 : Alopecurus aequalis at the north end of the park in a Black Ash swamp



A small population of P. friesii was found in the Nottawasaga River opposite Lamont Creek (Brunton 8125) in quiet, silty water (Type 15).

9) Alopecurus aequalis (Short-awn Foxtail) (Figure 60)

(6 Simcoe Co. records) A widespread but uncommon grass of wet, calcareous shores and meadows that is uncommon on and near the margin of the Canadian Shield in Ontario (Dore and McNeill 1980).

A large population was found (with Sparganium minimum - see page 65) in a wet, cool sandy swale in a Black Ash swamp (Type 9), north of the park (Brunton 8098).

10) Dichanthelium boreale (Northern Panic Grass)

(5 Simcoe Co. records) A northern and eastern grass of wet shores that is rare in southern Ontario off the Canadian Shield (Dore and McNeill 1980).

Found by R. Bobbette before 1975 at Marl Lake (exact site and habitat unknown) (Bobbette 1975).

11) Eragrostis frankii (Frank's Love Grass)

(5 Simcoe Co. records) A southern grass of open sandy sites in calcareous substrates that is uncommon but becoming increasingly less so in southern Ontario (Dore and McNeill 1980; personal observation).

A single population was found along the road to the Nottawasaga River boat launch; it may have been introduced there by a recreational vehicle from areas to the south (Brunton 8556).

12) Festuca saximontana (Rocky Mountain Fescue) (Figure 61)

(5 Simcoe Co. records) A widespread species of western North America that is rare in Ontario away from calcareous shores of the upper Great Lakes in Ontario (Dore and McNeill 1980).

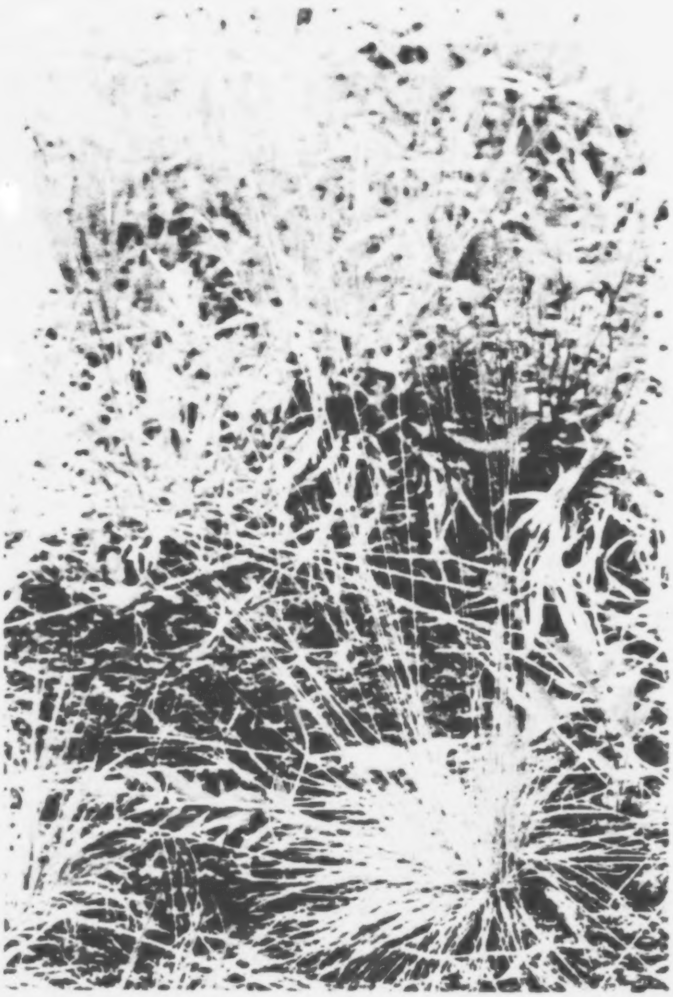
Found occasionally in disturbed sites in the high parabolic dunes in Type 7 and Type 8 (barrens and prairies) vegetation (Brunton 8109 and 8558).

13) Muhlenbergia schreberi (Nimble Will Grass)

(1 Simcoe Co. record) A common southern species in the southern portion (Lake Erie- Lake Ontario) of the province that is spreading northward rapidly (Dore and McNeill 1980).

A large population was found along the eastern side of the Oakview Woods (*Brunton 8452*), growing with *Leontodon taraxacoides*.

Figure 61: *Festuca saximontana* in the high dunes



14) *Sporobolus neglectus* (Overlooked Dropseed)

(4 Simcoe Co. records) An abundant roadside grass in much of southern Ontario it is, as its name suggest, often overlooked because of its late development and obscure appearance (Dore and McNeill 1980); a native of open shores.

Seen abundantly along Golf Course Road (with *S. vaginiflorus* and likely much more common in the area thats indicated by the records (*Brunton 8511*).

15) Trisetum melicoides (Melica False-oats)

.No other Simcoe Co. record) A common northern (subarctic/boreal) species that is rare in southern Ontario and is confined here to sandy Great Lakes shores and the Ottawa Valley (Dore and McNeill 1980). It is not uncommon on the Bruce Peninsula (A.A. Reznicek, pers. comm.).

A single population was found in the 1970's by R. Bobbette and A.A. Reznicek in a roadside ditch by Oakview Woods beach and may well now be extirpated (A.A. Reznicek, pers. comm.); it was not found during this study.

16) Carex capillaris (Hair-like Sedge)

(5 Simcoe Co. records) A cosmopolitan sedge of boreal/subarctic regions in wet, calcareous, boggy sites (Hulten 1968) that is rare in southern Ontario off of the Great Lakes shores (cf. Morton and Venn 1984).

Seen commonly in the wetter portions of Cedar- Hemlock forest and mixed swamp forest (Types 6 and 10) in Oakview and Ross's Woods (Wasaga Beach Park Herbarium).

17) Carex foenea (Hay Sedge) (Figure 62)

(5 Simcoe Co. records) A common sedge of dry to arid sandy woods and woodland edges in southern Ontario prairies and oak savannahs (Catling et al. 1975) that is approaching (or at) the northern limit of its range here.

Seen occasionally at blow-out edges in the high parabolic dunes and in Red Oak - pine woods (Types 7 and 4).

18) Carex grayii (Gray's Sedge)

(5 Simcoe Co. records) A southern species of rich riparian deciduous forest that is at the northern limit of its range for this longitude in the Wasaga Beach area (Reznicek and Ball 1974).

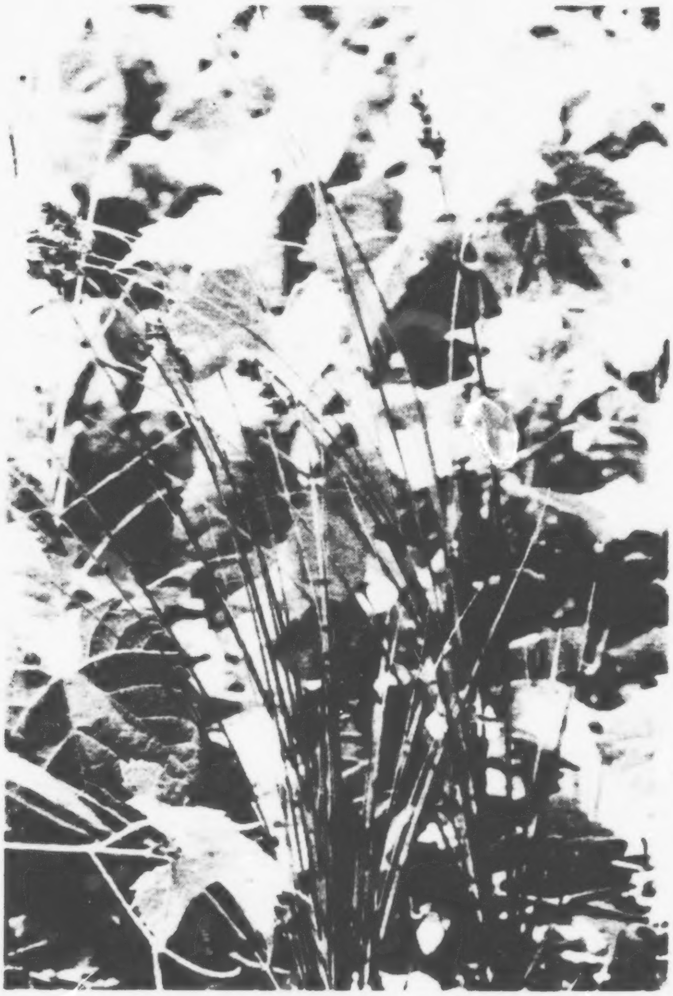
Seen in the rich Silver Maple swamp (Type 12) at the southeast end of Jacks(Lake Bobbette 1975; Reznicek and Ball 1984; A.A. Reznicek pers. comm.).

19) Carex livida (Leaden Sedge)

(3 Simcoe Co. records) A widespread, transcontinental taxon (var. grayana) of calcareous peatlands and meadows (Fernald 1950; Hulten 1968); typical of extensive fen meadows in southern Ontario (cf. Bobbette (1984) - Minesing Swamp).

Found commonly in Type 17 graminoid fen north of Jacks Lake and at the south end of Marl Lake (*fide* J.L. Riley) in Type 14 marl meadow.

Figure 62: *Carex foenea* at the edge of a blowout in the high dunes



20) *Carex lucorum* (Forest Sedge)

(3 Simcoe Co. records). A species at the western edge of its normal distribution that occurs almost exclusively on acidic substrates on the Canadian Shield and/or on acid sands (Crins and Ball 1983).

Seen along the edge of pine-oak forest in dry sand in the high dunes (*Brunton 8110*) (Type 4).

21) Carex pallescens (Pale Sedge)

(3 Simcoe Co. records) A widespread sedge of northeastern North America (Fernald 1950) that is at or near the western limit of its range in this area; prefers acidic substrates (cf. Morton and Venn 1984; Brunton 1988; Marie-Victorin 1947) and seldom common.

Found along the trail into Marl Lake (north side) during this study (9 July) at the moist edge of a low aspen - alder woods (Type 9) (no voucher collected).

22) Carex platyphylla (Broad-leaved Sedge)

(3 Simcoe Co. records) A widespread southern species of rich, circumneutral substrates, approaching the northern limit of range here.

Seen uncommonly in the young 'Sugar Bush' maple woods (Type 3) north of Jacks Lake (Brunton 8481).

23) Carex umbellata (Umbrella Sedge)

(5 Simcoe Co. records) A widespread but generally uncommon sedge of sandy, calcareous woods and shores; more common near Great Lakes shores (Voss 1972; Morton and Venn 1984).

A 1975 collection (Van Stam in Wasaga Park Herbarium) from Oakview Woods from Type 4 maple - cedar woods is the only park record.

24) Maianthemum canadense var. interior (Western Mayflower)

(rare in Simcoe Co. ?) A western variety of this common wildflower species, which becomes local and rare south and east of Lake Superior; often confined to calcareous sands and/or alvar areas in southern Ontario and may be specifically distinct (Brunton 1985).

Observed commonly in the high dunes in dry Type 5 Red Pine - White Pine forests and drier Type 4 oak-pine-maple forest.

25) Calypso bulbosa (Calypso orchid)

(4 Simcoe Co. records) A common orchid of moist, mossy coniferous forest in much of the Boreal Forest of western Canada and uncommon in northern Ontario; rare in southern Ontario (Whiting and Catling 1986). Formerly much less rare in south-central Ontario, the Wasaga Beach Provincial Park collections represent the largest extant Simcoe stands and some of the largest in southern Ontario.

Seen common in mature Hemlock - Cedar woods in Oakview Woods (Type 6) and formerly (?) in Ross's Woods (Van Stam in Wasaga Park herbarium; A.A. Reznicek, pers. comm.).

26) Goodyera oblongifolia X tesselata (hybrid Rattlesnake-plantain Orchid)

(1 Simcoe Co. record) A rare combination in Ontario, known from a previous Simcoe Co. record and specimens from Muskoka and Haliburton Districts (Whiting and Catling 1986).

A small clump was observed in Type 6 Cedar - Hemlock woods in Oakview Woods (Brunton 8458).

27) Platanthera hookerii (Hooker's Orchid)

(6 Simcoe Co. records) A widespread but seldom common plant of dry sandy woods in Ontario (Whiting and Catling 1986).

Found in scattered, small colonies in Type 4 oak-maple-pine and Type 3 maple - oak woods in the transverse dunes and the raised beaches areas.

28) Platanthera orbiculata var. orbiculata (Round-leaved Orchid)

(5 Simcoe Co. records) A widespread, transcontinental species (Luer 1975) that is rare in southern Ontario off of the Canadian Shield (Whiting and Catling 1986).

Once known (now extirpated ?) in Ross's Woods in Type 6 Cedar - Hemlock forest and observed (no voucher) near The Oxbow, Nottawasaga River in dry pine forest (Type 5) in this study.

29) Salix cordata (Heart-leaved Willow)

(6 Simcoe Co. records) A common northern species of calcareous shores and sands that is confined to the Great Lakes shores

(G.W. Argus pers. comm.) and the Ottawa Valley (personal observations). The inland records illustrated in Soper and Heimburger (1982) for southern Ontario are actually S. eriocephala, due to a misapplication of its synonym S. cordata Muhl., not Michx. as with true S. cordata.

Very common along the crests of back-beach sand ridges along the Nottawasaga Bay shoreline; an important sand stabilizer and very tolerant of disturbances.

30) Amaranthus tuberculatus (Water-hemp)

(1 Simcoe Co. record) A southern species of emergent, muddy shores and river banks that extends uncommonly across southern Ontario northward to the Canadian Shield; known elsewhere in Simcoe County from a station in the Minesing Swamp along the Nottawasaga River (Bobbette 1984).

Found along wet, grassy shores (Type 14) and the edge of Silver Maple swamp (Type 12) on the north shore of Jacks Lake, Nottawasaga River (Brunton 8468).

31) Arabis drummondii (Drummond's Rock-cress)

(3 Simcoe Co. records) A widespread western and northern species that is local and uncommon (formerly considered rare in Ontario) in eastern Canada (Hulten 1968).

Reported from the high dunes east of of Powerline Road by Bobbette (1975); not observed in this study.

32) Cakile edentula var. lacustris (Sea-rocket)

(5 Simcoe Co. records) An endemic of the lower Great Lakes (Erie, Ontario, Michigan and Lake Huron, with one station in southern Lake Superior); the inland subspecies of a widespread maritime species of sandy, open back-dune areas (Rodman 1974).

Found along the open sandy shores and back-beach at Beach 1, especially on the Nottawasaga River side (Brunton 8160); a recent arrival to the park (cf. Bobbette 1975; Carlisle et al. 1972) that is now well established in this area.

33) Hamamelis virginiana (Witch-hazel)

(2 Simcoe Co. records) A southern shrub of open, mesic or dry ravine slopes, sandy woods and woodland edges across the northern shores of Lake Erie and Ontario and throughout the Carolinian Zone, but rare elsewhere in Ontario (Soper and Heimburger 1982). Known elsewhere in Simcoe Co. from the southern tip of Lake Simcoe.

A remarkable discovery of a stand of this shrub at the north end of the park (Lot 11, Concession 17, Sunnidale Tp.) by the ski trail not far from the Chimaphila maculata site was made by A.A.Reznicek, R. Bobbette and P. Van Stam in 1976... on their way to see the Chimaphila (Van Stam, in Wasaga Beach Park Herbarium). The shrubs were not seen during this study, despite two searches of the area, but likely survive still in the essentially undisturbed Red Maple - Red Oak - White Pine forest (Type 4) in which they were found.

34) Crataegus flabellata (Fan-shaped Hawthorn)

(1 Simcoe Co. record) An uncommon eastern shrub in Ontario west of the Ottawa Valley, it is known in Simcoe County alony from the Wasaga Beach area (Phipps and Muniyamma 1980).

Seen commonly in open, silty shrub thickets (Type 8) with C. punctata upstream of the Klondike Road along the Nottawasaga River (Brunton 8467).

35) Geum laciniatum (Slashed Avens)

(3 Simcoe Co. records) A southern species of wet, calcareous sites (often disturbed sites); formerly considered rare in Ontario but now found to be too frequently established to warrent that designation (Argus and Pryer 1987).

Seen in a low, wet meadow (Type 14) at the south end of Marl Lake (Brunton 8151) and along the Nottawasaga River.

36) Oxalis stricta (Yellow Sorrel)

(5 Simcoe Co. records) A widespread southern species of open, sandy and disturbed sites; perhaps not native here.

A small population was found in the flower beds at the Park Office, Beach 3 (Brunton 8567).

37) Polygala polygama (Pink Milkwort) (Figure 63)

(4 Simcoe Co. records) A widespread species in eastern North America that prefers dry, warm, sandy sites and is approaching the northern limit of its range at Wasaga Beach (Gillett 1968).

Found uncommonly in dry sandy prairies (Type 8) and the edge of sand barrens (Type 7) in the high dunes.

38) Ceanothus americanus (American New Jersey Tea)

(4 Simcoe Co. records) A widespread southern shrub of dry, calcareous sites in southern Ontario approaching the northern limit of its range at Wasaga Beach (Soper and Heimburger 1982).

Quite common in the high transverse dunes and lower parabolic dunes areas, especially towards The Oxbow, Nottawasaga River (Carlisle et al. 1972; this study) in sand prairies(Type 8).

39) Ceanothus herbaceus (Narrow-leaved New Jersey Tea) (Figure 64)

(4 Simcoe Co. records) A locally but widely distributed species of dry, open sandy sites in southern and central Ontario, particularly along the Great Lakes shores and in the upper Ottawa Valley (Soper and Heimburger 1982).

Seen commonly in dry sand prairie (Type 8) vegetation and along the edge of blow-outs and other open sand barren (Type 7) sites in the high parabolic dune area.

40) Helianthemum canadense (Rock-rose)

(3 Simcoe Co. records) A southern species of dry, warm, sandy sites across eastern North America and reaching the northern limit of its range in this area (Scoggan 1978).

Found uncommonly at the edge of blow-outs and other disturbed sand barrens (Type 7) and scrapes in sand prairies (Type 8) in the high parabolic dunes of Wasaga Beach Provincial Park.

41) Viola adunca (Early Violet)

(5 Simcoe Co. records) A very widespread, northern species of dry sandy sites, especially in calcareous substrates (cf. Morton and Venn 1984; Brunton 1988); becomes local and rare south of the Canadian Shield in Ontario.

Found uncommonly in dry, sandy Type 4 Red Oak - White Pine forest in the higher transverse dunes and low parabolic dunes across the park (Brunton 8137).

Figure 63 : *Polygala polygama* in the high dunes (note *Asclepias tuberosa* and *Lithospermum caroliniense* behind)

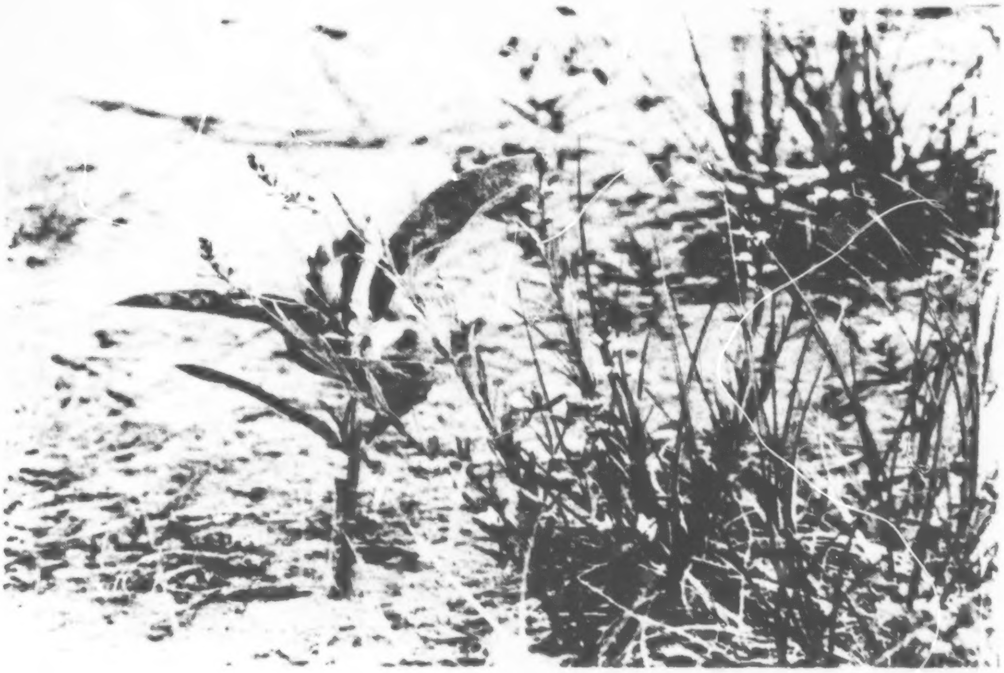
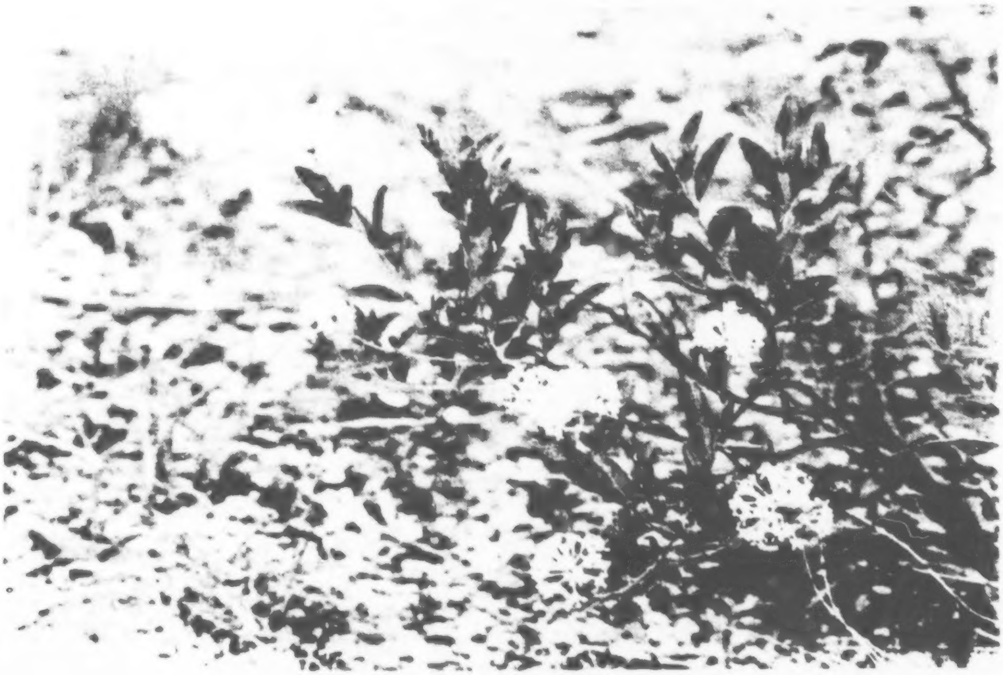


Figure 64 : *Ceanothus herbaceus* in the high dunes



42) Oenothera oakesiana (Oakes Evening-primrose)(Figure 25)

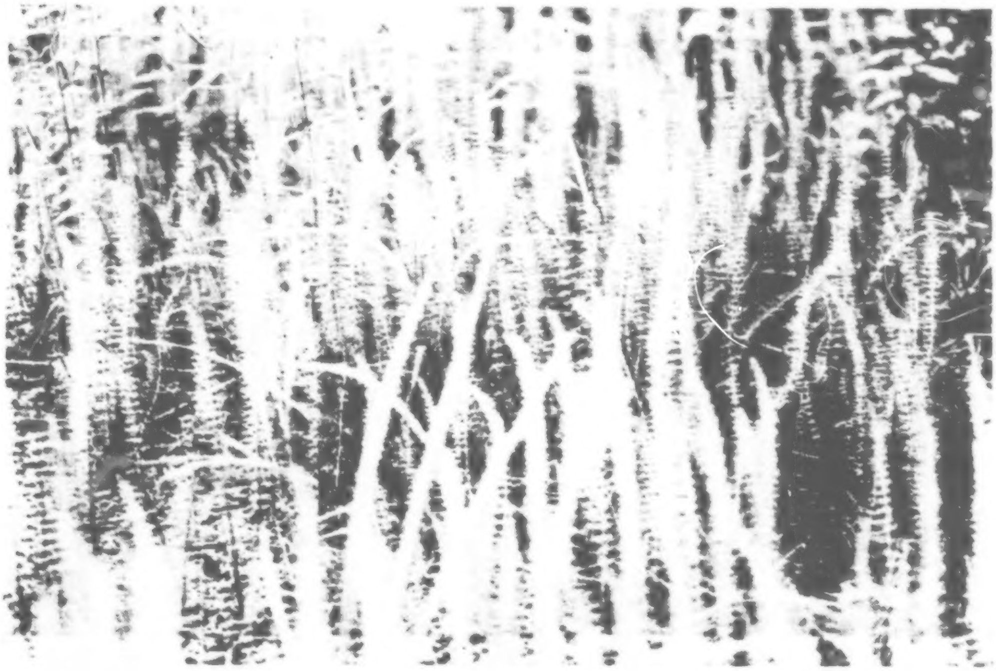
(rare in Simcoe Co. ?) A widespread northern species of sandy, calcareous shores in Ontario and Quebec but confined to the shores of the Great Lakes and along the Ottawa Valley in southern Ontario (cf. specimens on file in DAO, CAN).

First recorded by Frere Marie-Victorin and Frere Rolland-Germain from the shore of Nottawasaga Bay in August 1935 during their survey of the vegetation along the Great Lakes shores. A record also exists from a sandy roadside along Powerline Road (Van Stam, Wasaga Beach Park Herbarium) and it was found to be common on the edges of the blow-out (Type 7) at Lookout Dune during this study (Brunton 8214) - (see Figure 25, page 29). Likely uncommon in Type 7 and Type 8 vegetation across the high dunes and possibly along the Nottawasaga Bay shore.

43) Hippurus vulgaris (Mare's-tail) (Figure 65)

(3 Simcoe Co. records) A cosmopolitan boreal/subarctic species of cold, wet, emergent vegetation in calcareous substrates (Hulten 1968); rare and local in such sites in southern Ontario.

Figure 65 : Hippurus vulgaris at the Nottawasaga River shore at Powerline Road (north)



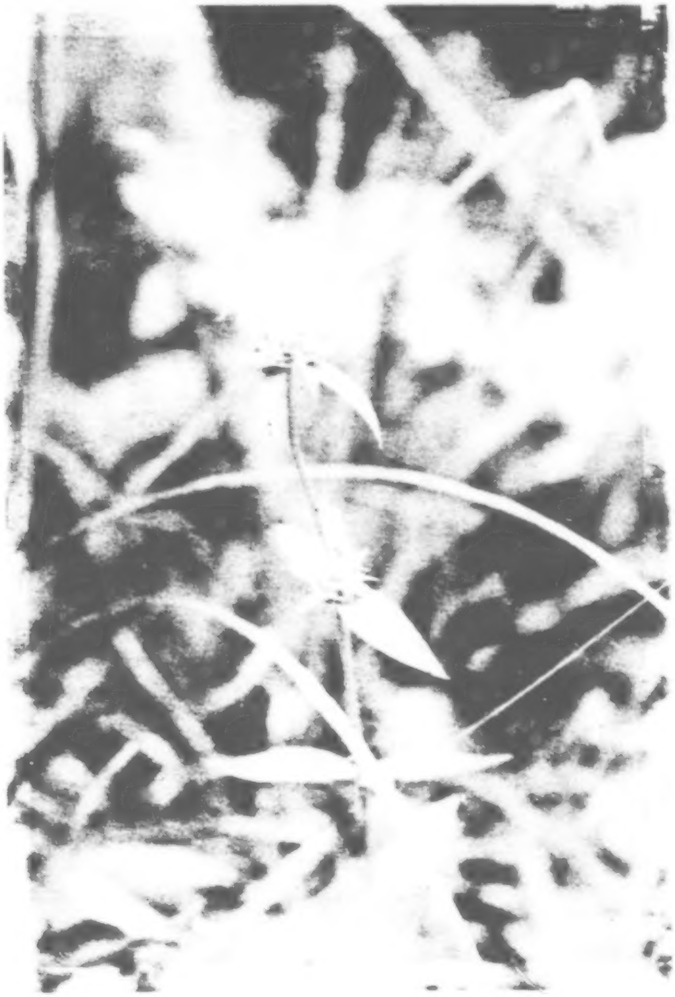
One large population is thriving in a cold seepage area in shallow river flats with emergent (Type 15) vegetation at the Nottawasaga River (*Van Stam*, Wasaga Beach Park Herbarium; *Brunton 8538*).

44) *Halenia deflexa* (Spurred Gentian) (Figure 66)

(5 Simcoe Co. records) A widespread, transcontinental, boreal species that is rare and local away from the Great Lakes shores in southern Ontario (Gillett 1963; Morton and Venn 1984).

Quite common in disturbed Type 4 (Red Maple - Cedar - Poplar) forest and along the mossy edge of shaded Type 6 Cedar - Hemlock forest in Ross's and Oakview Woods (Bobbette 1975; *Brunton 8457*).

Figure 66: *Halenia deflexa* in Oakview Woods



45) Asclepias tuberosa (Butterfly-weed) (Figures 63 and 67)

(4 Simcoe Co. Records). A common southern and prairie species of dry, sandy ground along lakeshores and calcareous meadows, at the northern limit of its natural range in Ottawa Valley) because of its dye properties (W.G. Dore, pers. comm.).

A common and conspicuous species of disturbed roadsides and open sand areas (Types 1, 7 and 8) - wherever sand is open and unvegetated.

Figure 67: Asclepias tuberosa along Powerline Road

46) *Agalinis tenuifolia* var. *parviflora* (Narrow-leaved Agalinus)

(1 Simcoe Co. record) A locally abundant species of open, dry, calcareous meadows and shores across southern Ontario that is rare on the Canadian Shield (Scoggan 1979; Morton and Venn 1982; Brunton 1988).

Found uncommonly in disturbed, open roadsides (Type 1) near Jacks Lake and along Powerline Road (*Brunton 8512* and *8563*).

47) *Hieracium gronovii* (Hairy Hawkweed)

(3 Simcoe Co. records) A widespread southern species that was formerly considered rare in Ontario but has been delisted because of the relatively large number of sites now known (Argus and Pryer 1987); a species of dry, sandy oak and pine forests (Gartshore *et al*. 1987).

Rarely encountered in the high dunes in areas of light disturbance within Type 5 pine forests; formerly more common here (Carlisle *et al*. 1972), but apparently suffering from competition and succession - much like the situation with *Cirsium hillii* (see page 65). It was observed only once, in the high parabolic dunes, during this study (*Brunton 8560*).

LOCALLY SIGNIFICANT FLORA

The following species are not rare in Simcoe County, but are still of importance because of highly restricted distributions (e.g. shoreline species), as markers of range limits or as important populations of uncommon taxa. The rationale for each listing is noted following the species' name.

48) Juniperus virginiana
49) Triglochin maritima
50) Triglochin palustre
51) Ammophila breviligulata
52) Andropogon gerardii
53) Calamagrostis stricta ssp. inexpansa
54) Dichanthelium acuminatum var. lindheimeri
55) Dichanthelium sabulorum
56) Hierochloe odorata
57) Muhlenbergia mexicana var. filiformis
58) Sorghastrum nutans
59) Carex gynocrates
60) Carex muhlenbergii
61) Cladium mariscoides
62) Cyperus filiculmis
63) Dulichium arundinaceum
64) Eleocharis elliptica
65) Scirpus pendulus
66) Scirpus hudsonianus
67) Juncus brachycephalus
68) Lilium michiganense
69) Tofieldia glutinosa
70) Cypripedium arietinum
71) Goodyera oblongifolia
72) Ulmus rubra
73) Arceuthobium pusillum
74) Polygonum hydropiperoides
75) Rumex verticillatus
76) Anemone multifida
77) Anemone quinquefolia
78) Caulophyllum thalictroides

79) Menispermum canadense
80) Arabis hoelboellii
81) Arabis lyrata
82) Parnassia parviflora
83) Amelanchier arborea
ssp. arborea
84) Prunus pumila ssp. pumila
85) Zanthoxylum americanum
86) Toxicodendron radicans
87) Proserpinaca palustris
88) Pyrola americana
89) Cuscuta gronovii
90) Lithospermum caroliniense
91) Monarda fistulosa
92) Utricularia minor
93) Galium labradoricum
94) Houstonia longifolia
95) Aster laevis
96) Solidago ohioense

48) Juniperus virginiana (Red Juniper) A southern calcicolous tree or shrub found commonly in Simcoe County only along the edge of the Canadian Shield; rare in high dunes (Type 8) (Bobbette 1975).

49) Triglochin maritima (Arrow-grass) A widespread northern peatland species in cold fens, found locally and uncommonly in such sites in southern Ontario ; common in Type 17 (Jacks Lk. Fen)

50) Triglochin palustre (Arrow-grass) As 49), above; uncommon in Type 14 (Marl Lake).

51) Ammophila breviligulata (Beach Grass) A characteristic species of dry sea beaches along the Atlantic Ocean and an important sand-binder on beaches in the Great Lakes; not found inland of the lakes (Dore and McNeill 1980); common along the Nottawasaga Bay shore (Types 1 and 7).

52) Andropogon gerardii (Big Bluestem Grass) Locally abundant southern species of dry sandy areas and prairies and at the northern edge of its normal Ontario range here (Dore and McNeill 1980).

53) Calamagrostis stricta ssp. inexpansa (Northern Reed Grass) A widespread species of sandy sites in the boreal areas of northern Ontario but rare in southern Ontario away from the Great Lakes shores (Dore and McNeill 1980); common in Type 7 barrens near New Wasaga Beach.

54) Dichanthelium acuminatum var. lindheimeri (Lindheimer's Panic Grass) Uncommon taxon of sandy and rocky lake and river shores across south-central and central Ontario; rare away from the Great Lakes shores and the Ottawa Valley (Dore and McNeill 1980); uncommon in Type 14 marl meadows at Marl Lake.

55) Dichanthelium sabulorum (Sand Panic Grass) Uncommon species of dry shores and dunes in sand across south-central Ontario; rare beyond that range (Dore and McNeill 1980); scattered in Type 7 barrens and Type 5 forest in the high dunes.

56) Hierochloe odorata (Sweet Grass) Widespread prairie grass of dry shores and meadows; uncommon and local in southern Ontario (Dore and McNeill 1980); formerly along the shore by Oakview Woods - extirpated ? (Bobbette 1975).

57) Muhlenbergia mexicana var. filiformis (Mexican Muhly Grass) A common variety of a common species in eastern Ontario but becoming rare and local north and west of Lake Ontario (Dore and McNeill 1980); open sandy, disturbed sites in the park.

58) Sorghastrum nutans (Indian Grass) Scarce southwestern species of dry meadows and prairies in southern Ontario and rare away from the Great Lakes shores and the Ottawa Valley (Dore and McNeill 1980): common in the park in dry, disturbed sites.

59) Carex gynocrates (sedge) Widespread species of northern fens and fen forests, found locally and uncommonly along Great Lakes shores and rarely inland, in southern Ontario; common in Type 11 forest at Marl Lake and Jacks Lake Fen.

60) Carex muhlenbergii (Muhlenberg's Sedge) Southern species of dry, sandy sites (often disturbed), approaching the northern limit of its range here; scattered in Type 1 and 7 sites in the Wasaga Beach area.

61) Cladium mariscoides (Nut-sedge) Uncommon eastern species of fen meadows and wet shores; locally abundant in fens and on peaty shores in south-central Ontario; common in Type 17 and 16 vegetation at Marl Lake.

62) Cyperus filiculmis (Slender Cyperus) Uncommon southern sedge of dry, open sand of shores and disturbed sites across southern Ontario; only recently delisted from Rare in Ontario by Argus and Pryer (1987); uncommon in disturbed sand sites in the park.

63) Dulichium arundinaceum (Three-way Sedge) Common shoreline aquatic on the Canadian Shield of Ontario but uncommon and local south of there; one large patch at Jacks Lake in Type 15 vegetation.

64) Eleocharis elliptica (Round Spikerush) A widespread northern sedge of wet, calcareous shores and meadows that is local and uncommon in wet fen meadows in southern Ontario; rare in Type 17 fen north of Jacks Lake.

65) Scirpus pendulus (Drooping Bulrush) A southern sedge that is local and uncommon at the northern edge of its range, in wet, calcareous, often disturbed and partially shaded sites (Voss 1972; Brunton 1983); a few plants along a disturbed track at Marl Lake.

66) *Scirpus hudsonianus* (Northern Wool-grass) Widespread boreal/ subarctic species of cool fens and peatlands across northern Ontario but local and uncommon off of the Canadian Shield (Brunton 1984); common in Type 17 clearings in the Jacks Lake Fen.

67) *Juncus brachycephalus* (Rush) A species of wet shores, marshes and meadows (usually calcareous) of north-central North America (Hermann 1975) and typical of northern fens in Ontario (P.M. Catling, pers. comm.); local and rare in southern Ontario off of the Canadian Shield; found in Type 11 swamp forest at Marl Lake and the Jacks Lake Fen.

68) *Lilium michiganense* (Michigan Lily) A southern species of rich river bank levees and moist calcareous sites in southern Ontario that it at the northern limit of its range here; one population along the south shore of Jacks Lake (A.A. Reznicek pers. comm; Bobbette 1975).

69) *Tofieldia glutinosa* (False Asphodel) As with 64), above; formerly in a disturbed ditch by the beach at Oakview Woods (A,A, Reznicek, pers. comm.) - extirpated ?

70) *Cypripedium arietinum* (Ram's-head Lady-slipper) Locally common Great Lakes Region endemic (Luer 1975) of cool coniferous woods, especially along the Great Lakes shores (Whiting and Catling 1986) and only recently delisted from Rare in Ontario by Argus and Pryer (1987); common in Type 6 forest in Oakview Woods and formerly (now extirpated ?) in Ross's Woods (A.A. Reznicek, pers. comm.; Bobbette 1975).

71) *Goodyera oblongifolia* (Menzie's Rattlesnake-plantain Orchid) Common western species of mossy, calcareous woods that is locally abundant along the shores of the Great Lakes (Whiting and Catling 1986) and only recently was delisted from Rare in Ontario by Argus and Pryer (1987).

72) *Ulmus rubra* (Slippery Elm) A common, small tree of southern areas that becomes rare north of the Lake Erie - Lake Ontario shores and the Ottawa Valley in southern Ontario (Hosie 1969); a specimen (*R. Seely* in Wasaga Beach Park Herbarium) was collected along the Nottawasaga River south of Powerline Road in 1973 ; exact location unclear.

73) *Arceuthobium pusillum* (Dwarf Mistle-toe) A woody parasite of Black Spruce (and rarely other conifers) across the Boreal Forest Region of eastern Canada, but rare and local south of the Canadian Shield (Hawksworth and Scharpf 1984); rare in Ross's Woods (Bobbette 1975;1984) and possibly the Jacks Lake Fen (Carlisle *et al*. 1972).

74) *Polygonum hydropiperoides* (False Water-pepper) A southern species of rich riparian forest edges and marshy shores in calcareous substrates at the northern edge of its range here; abundant along the north shore of Jacks Lake in Type 15 aquatic vegetation.

75) Rumex verticillatus (Water Dock) A southern aquatic of marshy, calcareous shores at the northern edge of its range here; uncommon in marshy Type 15 and 16 vegetation along the Nottawasaga River near Jacks Lake.

76) Anemone multifida (Cut-leaved Anemone) A common species of the western prairie that is uncommon and local along the Great Lakes shores in sand dune areas and sandy prairie sites; fairly common in the high dunes at Wasaga Beach Provincial Park.

77) Anemone quinquefolia (Wood Anemone) A common species of rich southern hardwoods and northern deciduous forest but curiously rare in between; formerly known from a disturbed site by Oakview Woods (A.A. Reznicek, pers. comm.) but perhaps extirpated.

78) Caulopyllum thalictroides var. giganteum (Blue Cohosh) A common species of rich hardwoods across southern Ontario, at the northern edge of its range here (Dore 1964); a small population occurs in rich Type 3 forest north of Jacks Lake.

79) Menispermum canadense (Moonseed) A shrubby vine of rich riparian situations across southern Ontario, at the northern edge of its range here (Soper and Heimburger 1982); fairly common in spring-flooded Silver Maple forest (Type 12) at Jacks Lake.

80) Arabis holboellii (Holboell's Rock-cress) Cordilleran species of western North America that is also found sparingly along rocky and sandy shores (calcareous substrates) of the Great Lakes (Marquis and Voss 1981) and the Ottawa Valley (Brunton and Lafontaine 1974); very rare inland and only recently delisted from Rare in Ontario by Argus and Pryer (1987).

81) Arabis lyrata (Lyre-leaved Rock-cress) Variety lyrata is virtually endemic to the Great Lakes Region and is found commonly on sandy shores (but not far inland); common in sandy sites (Type 7) along the beach and in the high dunes.

82) Parnassia parviflora (Grass-of-parnassis) A widespread northern species of open, calcareous shores and wet meadows in boreal Ontario; local and rare in southern Ontario; found in the 1970's by A.A. Reznicek and R. Bobbette at Flos (Allenwood) Beach; site bulldozed ca. 1978 (J. Winters, pers. comm.).

83) Amelanchier arborea ssp. arborea (Juneberry) A widespread shrub or small tree of dry, calcareous slopes and young deciduous forest that is at the northern limit of its range here (McKay 1973); known from a 1975 collection by Van Stam, Wasaga Beach Park Herbarium, from the north side of Powerline Roadwest of Klondike Road (habitat unknown).

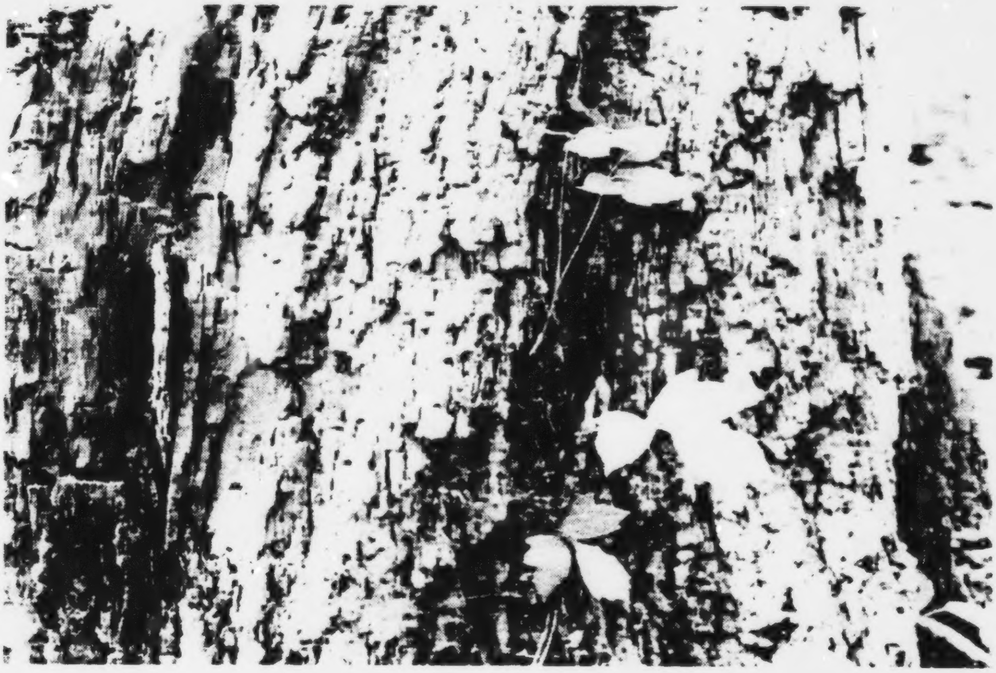
84) Prunus pumila ssp. pumila (Sand Cherry) Confined largely to dry, calcareous sand beaches and dunes on the Great Lakes shores

and very rare inland (S. McKay, pers. comm.); common along the Nottawasaga Bay shore beaches (Type 7).

85) Zanthoxylum americanum (Prickly-ash) A locally abundant, thicket-forming southern shrub of open, moist to dry, calcareous sites at the edge of its range here (Soper and Heimburger 1982); scattered in young Type 3 hardwoods north of Jacks Lake.

86) Toxicodendron radicans (Climbing Poison-ivy) The southern version of this well-known shrub, becoming common only in the Carolinian Zone of southwestern Ontario and at the northern limit of its range in this area; found only (see Figure 68) in the young, rich Type 3 hardwoods northeast of Jacks Lake.

Figure 68 : Toxicodendron radicans climbing up a large Sugar Maple north east of Jacks Lake



87) Proserpinaca palustris (Mermaid-weed) An uncommon and local calcicolous aquatic species across southern Ontario, at the northern edge of its range here; uncommon in Type 14 marl meadows at Marl Lake.

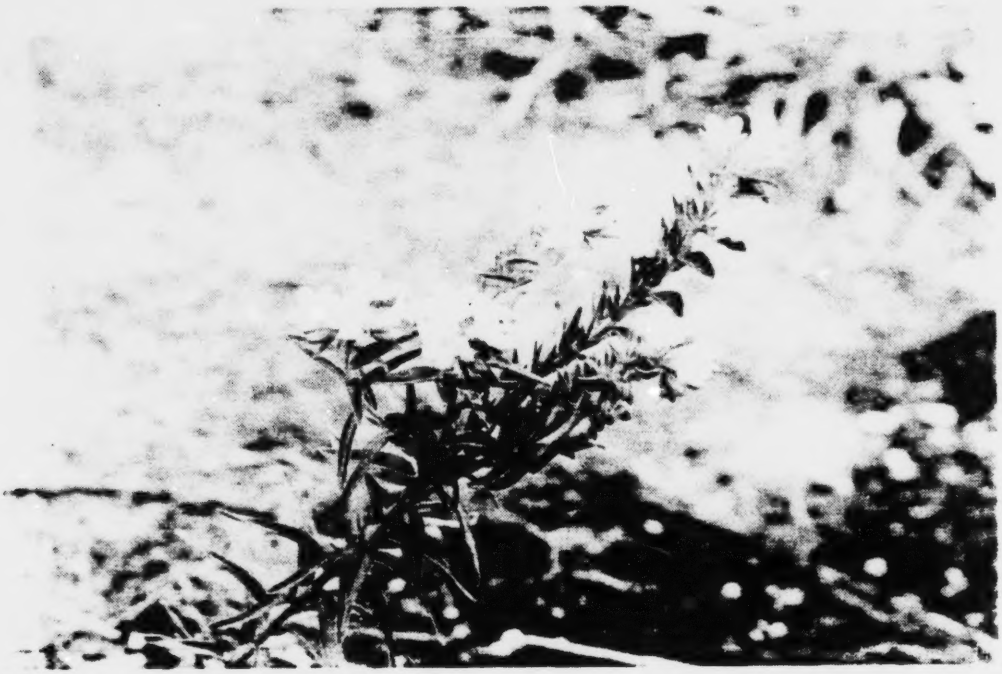
88) Pyrola americana (Round-leaved Shinleaf) Widespread southern species of dry, sandy mixed or coniferous forest; uncommon and local in southern Ontario; fairly common in dry oak - pine (Type 4) forest in the higher transverse and lower parabolic dunes areas.

89) Cuscuta gronovii (Dodder) A southern parasitic vine on a

a wide variety of hosts in low, rich, calcareous forest and thicket situations and at the natural northern limit of its range here (Crins and Ford 1988); abundant in a Silver Maple swamp (Type 12) on the south shore of Jacks Lake.

90) Lithospermum carolinense (Puccoon) - (Figure 69) A southern species confined largely to the shores of Lakes Erie and Huron and very rare beyond that (Ramcharan 1975); common in sandy, open sites throughout the park.

Figure 69: Lithospermum carolinense by Powerline Road



91) Monarda fistulosa (Wild Bergamot) A widespread species of sandy, calcareous ground in warmer sites in central and eastern North America at its northern limit of range here (Pringle 1988); common in the high dunes in Type 8 and 7 clearings.

92) Utricularia minor (Least Bladderwort) A common aquatic species of boreal fens and somewhat calcareous pools in northern Ontario; becomes local and uncommon in southern Ontario in fen pools; uncommon in pools in Type 14 marl meadows at Marl Lake and in Type 17 graminoid fen in the Jacks Lake fen.

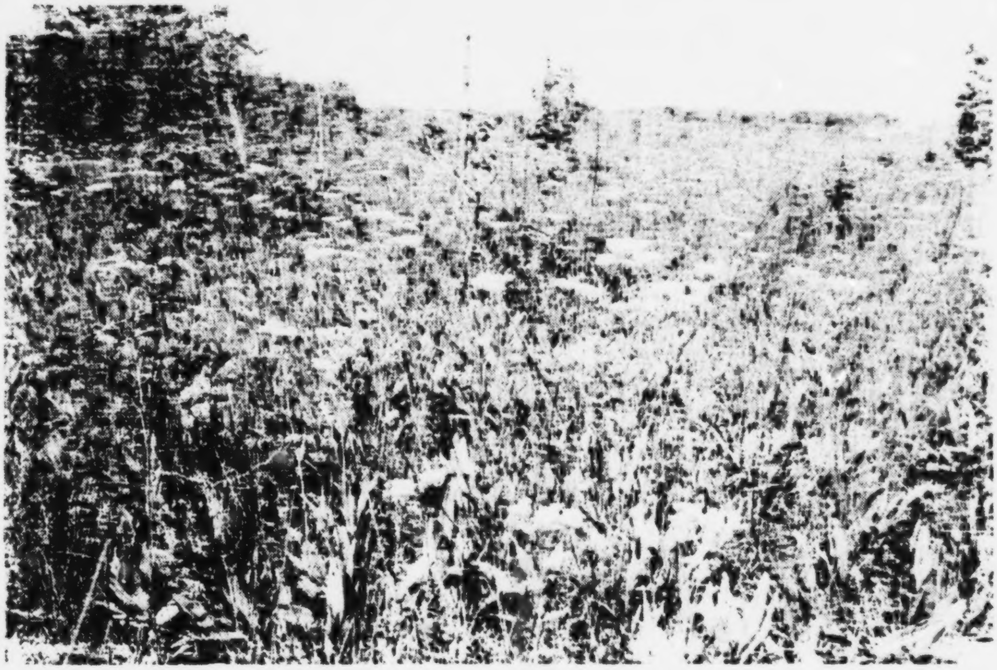
93) Galium labradoricum (Labrador Bedstraw) A widespread species of cold, wet calcareous peatlands across northern Ontario but confined to scattered fen meadows in southern Ontario (Dugal 1982); common in the Jacks Lake fen in Type 17 graminoid fen vegetation and in Type 14 marl meadows at Marl Lake.

94) Houstonia longifolia (Bluets) A common western North American species of dry, calcareous sites that extends eastward along the shores of the Great Lakes; common in sandy, disturbed sites (Types 1, 7 and 8) throughout the Park.

95) Aster laevis (Smooth Aster) A southern and western species that is rare in Ontario away from southern Georgian Bay and the Lake Erie shore (Semple and Heard 1987); common in sandy sites in the park (Types 1, 7 and 8).

96) Solidago ohioensis (Ohio Goldenrod) - (Figure 70) A Great Lakes Region endemic that is rare away from its restricted and declining southern Georgian Bay center of abundance; found only rarely (only on Great Lakes shores) in Ontario away from Lake Huron (Pringle 1982; Semple and Ringius 1983); forms a massive stand on Type 14 marl meadow at the south end of Marl Lake.

Figure 70: Solidago ohioensis at the south end of Marl Lake



3) SIGNIFICANT FAUNA

During life science inventories faunal data are gathered incidentally to vegetation and floral data. The former is more difficult to interpret without a great deal of field time being expended, and time and resources available for this study did not permit that. As such, faunal discussion are less certain in their conclusions, as they are necessarily based on incomplete information.

a) BIRDS

A number of species can be considered significant at a Regional (Simcoe County) or Provincial Level, as follows.

The following are identified as rare in the province of Ontario in the Atlas of Breeding Birds of Ontario (Cadman *et al*. 1987) and/or the Ontario Rare Breeding Bird Program (Cadman 1988).

1) *Least Bittern* Always an uncommon species of dense reed beds and moderately dense cat-tail stands in deep marsh water across southern Ontario, this inconspicuous little heron has apparently declined in numbers in recent years (Woodliffe 1987). At least 6 pairs were known to breed at Marl Lake in the late 1920's and nests were found in the late 1930's (Devitt 1967). It was apparently still breeding there by 1985 (Woodliffe 1987), although none were observed during this study. The water levels of the lake are dramatically reduced from former years (Devitt 1967; personal observation) and this may have made the extensive *Scirpus* beds too dry for breeding Least Bittern.

2) *Yellow Rail* A common species of the huge coastal fens of the James Bay shore of northern Ontario, this is a rare, local and declining breeding species in scattered fen meadows in southern Ontario (Prescott 1987). There are no definite records for the study area, but a possible observation (sound only) was made during this study in open graminoid fen meadow at the south end of Marl Lake. The habitat here is excellent (personal observations), if confined, and the breeding of this very inconspicuous species in southern Simcoe County (Holland Marsh) has been known for decades.

3) *Piping Plover* This tiny shorebird is Endangered in Ontario and Threatened in Canada, being a breeding species of the same extensive, pure sand beaches of the Great Lakes shores that are so prized and so heavily used for human recreation (Lambert 1987). It was formerly fairly common along the Nottawasaga Bay shore. Devitt (1967) saw over a dozen one day in 1935 near Allanwood Beach. The last nesting was recorded in 1938 and none are known to have nested in southern Ontario since 1977. A pair spent some time on Wasaga Beach in 1981, although no proof of breeding could be found. None were observed here during this study, although small pockets of suitable breeding habitat remain at the north end of Beach 1 and it is possible, if improbable, that the species could be re-established.

4) Black Tern Remarkable as it seems to consider this formerly common marsh-breeding tern a rare species, its population in southern Ontario has declined so dramatically in recent years that serious concern for its future is being raised (Cadman 1988). It breeds most successfully in rich cat-tail marshes in which dense islets of cat-tail are scattered abundantly across deep, fresh water; muskrat houses are frequently used as nesting platforms. The center of its Ontario abundance has been a 50 to 100 km wide band just south of the Canadian Shield(Dunn 1987). It has bred for years in Marl Lake (at least since the early 1920's - Devitt 1967)and was still present in 1988. Only 3 birds were seen during this study, however, and they were all adults. They were seen at Marl Lake and also feeding along the shore of Nottawasaga Bay at Beach 3.

5) Caspian Tern This species has a remarkable large, world-wide distribution and is a local and frequently uncommon or rare breeding species over much of Canada (Godfrey 1986). It is a colonial breeding species long known to nest on off-shore islands in Georgian Bay and, to a lesser extent, in Lake Ontario (Blokpoel 1987). While considered to be expanding its population on the Great Lakes in the 1980's, the ever-growing numbers of Herring Gulls are considered a threat to its breeding success; it is still classified as rare in Ontario and (by C.O.S.E.W.I.C.) Canada (Blokpoel 1987). None nest in Wasaga Beach Park or even Nottawasaga Bay, but several can be seen each day cruising the off-shore shallows of the park beaches for small minnows. The beach and very shallow off-shore bars are used as resting and preening sites during quiet times (dawn and dusk).

6) Loggerhead Shrike In the 1960's this was a fairly common breeding species of dry, scrubby pastureland and overgrown meadows across southern Ontario and Simcoe County (Devitt 1967); it has declined so dramatically here and elsewhere in Canada since that time that it is now considered Threatened in Canada (Cadman 1987). While much of the park area is (and was) unsuitable habitat, the scrubby hawthorn - dogwood thicket area near Klondike Road offers good breeding habitat. None were observed during this study and no breeding evidence for Loggerhead Shrike in the Wasaga Beach area in the 1980's is known (Cadman 1987).

7) Prairie Warbler The first Canadian nest of Prairie Warbler was found at Wasaga Beach by P. Harrington in June 1923 (Harrington

1924) and in the 1920's there were an estimated 150 pairs breeding in scrubby Juniper-dominated beach tops against the pine forest edge, between Oakview Woods and Beach 1 (Devitt 1967). By 1933 recreational pressure (primarily the construction of cottages) eliminated all but the small population at Allenwood Beach where they nested until at least 1940. By the mid 1960's none were left at Wasaga Beach. Approximately 500 pairs remain in Ontario, most found in scrubby Canadian Shield juniper barrens along Georgian Bay and in the Kawartha - Rideau Lakes areas (Lambert 1987B). No breeding Prairie Warblers have been recorded within 50 km of Wasaga Beach in the 1980's and with the destruction of the extensive juniper thickets of Nottawasaga Bay beach tops, the return of this species seems very unlikely.

Several species are recorded from Wasaga Beach Provincial Park that are considered to be very local and/or rare in Simcoe County (Devitt 1967) and/or southern Ontario (Cadman et al. 1987) as breeding species. They are considered to be Regionally significant and are described below.

8) Yellow-billed Cuckoo A widespread species of deciduous woods and thickets in the Carolinian Zone of southwestern Ontario and sparingly across the southern Great Lakes - St. Lawrence Forest Region, this bird is at the northern edge of its range in the park area (Helleiner 1987). It was found nesting at Marl Lake in 1954 (Devitt 1967) and was also observed at the north end of the lake during this study (a pair of birds); it likely still breeds in deciduous woods by the golf course there.

9) Sedge Wren A locally abundant species of open fen meadows and willow thickets in fens across southern and northwestern Ontario, this tiny bird forms loose, rather inconspicuous colonies (Gould 1987). It was found breeding at Marl Lake in the 1930's (Devitt 1967) and is recorded as a breeding species from Wasaga Beach Provincial Park (Anonymous 1980); the latter record must be suspect, in the light of no suitable breeding habitat being evident. No Sedge Wrens were observed during this study. As Devitt(1967) points out, this species does not breed in the same site each year and may have 'skipped' the dry, low-water period experienced recently.

10) Golden-crowned Kinglet This is a common species of cool, northern coniferous forests (bog margins, etc.) that becomes rare and local as a breeding species off the Canadian Shield in southern Ontario (Klinkenberg 1987). A nest was discovered (probably at Oakview or Ross's Woods) by P. Harrington in

1929 (Devitt 1967). While no subsequent breeding records are known, the species does breed in the Minesing Swamp (Klinkenberg 1987) and can be expected to breed occasionally in Oakview Woods and the Jacks Lake Fen, probably during wetter periods.

11) Grasshopper Sparrow This diminutive and quiet little bird is loosely colonial in dry, open, scrubby fields that are slightly overgrown or are planted in small conifers across southern Ontario; it is most common off the Canadian Shield and west of the Frontenac Axis (Rising 1987). A relatively recent arrival in Ontario that has taken advantage of the clearing of land for agriculture, it was rare here in the 19th century (McIlwraith 1885) and was first observed in Simcoe County in 1933, just south of Jacks Lake (Devitt 1967). By the mid 1960's it was also known to be breeding at a number of other sites in the county, including Marl Lake; a small colony was observed there (at the north end in scrubby, conifer-planted fields) during this study as well.

b) MAMMALS

No significant mammals were observed during this study nor could the presence of any be inferred from the literature (e.g. Peterson 1967).

c) REPTILES AND AMPHIBIANS

No significant reptiles or amphibians were observed during this study or could be found inferred from the literature. Several important/significant species occur not far away in habitats also found in Wasaga Beach Provincial Park and may be recorded one day. They include the following :

Eastern Hognose Snake An uncommon snake of sandy, dry sites that is locally distributed along the Georgian Bay shore and southwestern Ontario (Cook 1984; Plourde *et al*. 1988); known from northern Simcoe County.

Northern Ring-necked Snake A secretive, nocturnal snake of hardwoods and mixed forests with a similar distribution in this area to that of Hognose Snake (above).

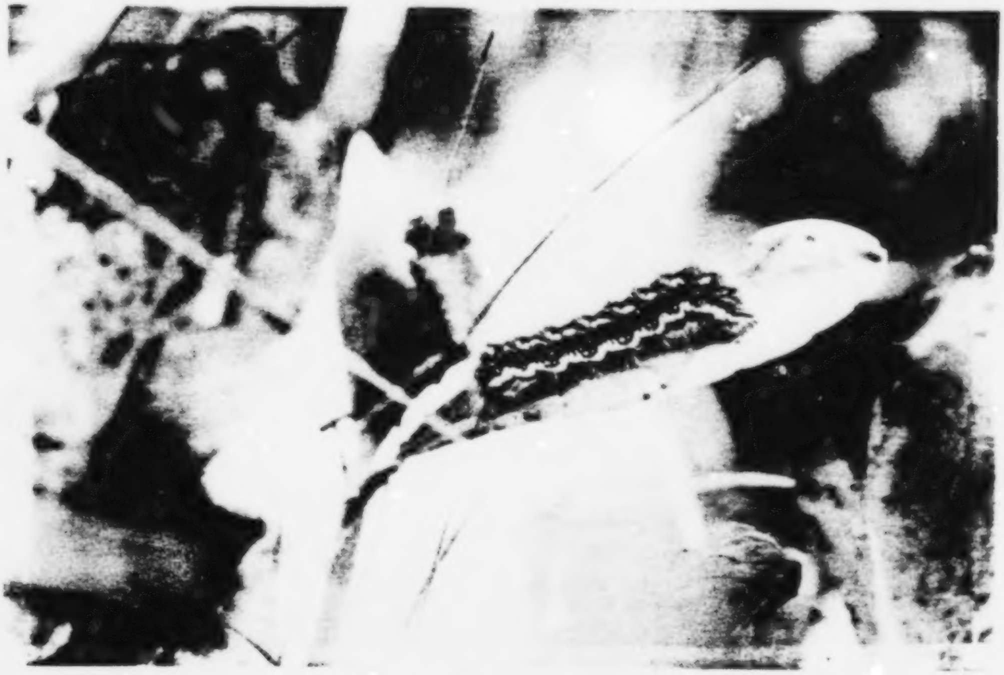
Fox Snake Like the Hognose Snake, this dry woodland species is locally found (sometimes in numbers) along the Georgian Bay shoreline (Plourde *et al*. 1988). It is a southern species that is endemic to the shores of the lower Great Lakes (the eastern subspecies) and is rare and increasingly threatened (Oldham 1988). Wasaga

Beach Provincial Park is within the limits of that range and contains suitable habitat within which this species might be found.

d) OTHER FAUNA

Two remarkable insects were discovered in the Jacks Lake Fen during this study (Figure 71). Both were discovered as larvae, feeding on Bog-bean leaves (Menyanthes trifoliata). Previous to this discovery, only one species of lepidoptera was known to feed on this plant. That animal is an extremely rare silk moth of the genus Hemileuca that is as yet undescribed to science (Reddoch 1984). While one of two species found during this study looks remarkably like the brightly colored and conspicuous larvae of the undescribed Hemileuca and was at first thought to be that animal, it is a closely mimicing tiger moth. It is either a new species for science or the first discovery of the larvae of a very rare but previously described tiger moth (J.D. Lafontaine, pers. comm.). Living specimens were brought to Ottawa where they produced pupae that are over-wintering and will emerge in the spring of 1989, at which time more definitive conclusions may be drawn.

Figure 71 : Tiger-moth (sp. nov. ?) feeding on Menyanthes in the Jacks Lake Fen



A concentrated search for other specimens and for signs of the Hemileuca moth (the presence of which is suggested by the mimicking tiger moth) was undertaken in early October, without success. The similarity of the habitat in Jacks Lake Fen to Hemileuca sites in eastern Ontario is striking (personal observation) and suggests that futher investigations in early summer would be warranted.

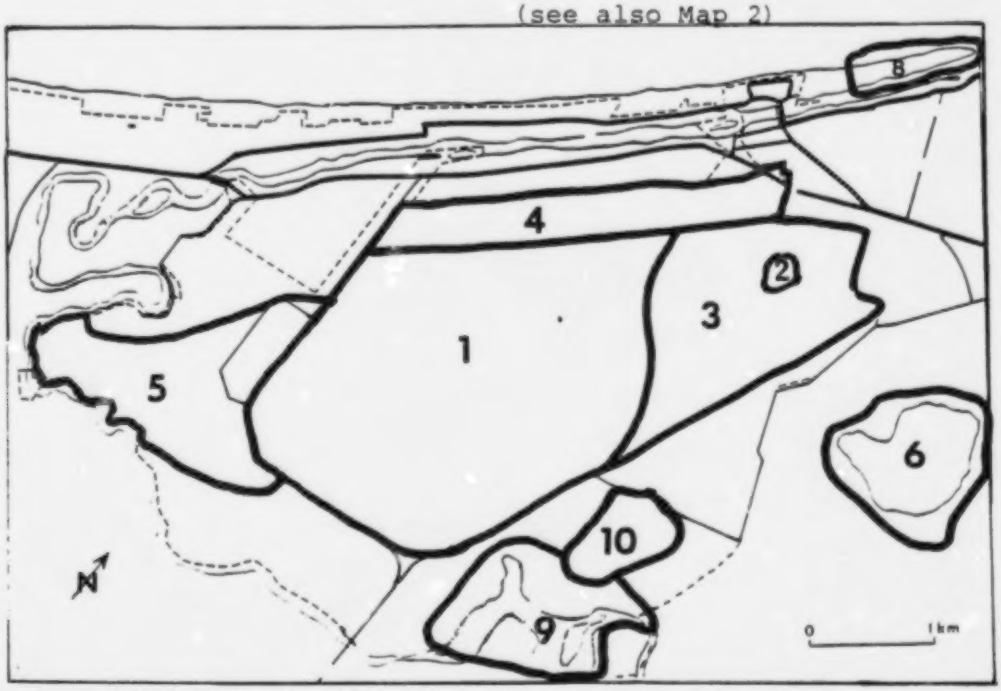
The second moth larvae found in the Jacks Lake Fen, also feeding on Menyanthes, is a small, gray, non-descript tiger moth; it also produced a pupae and will be re-examined upon emergence in the spring of 1989 (J.D. Lafontaine, pers. comm.).

4) SIGNIFICANT AREAS

Ten areas are considered to support natural values of significance in the study area (Figure 72). They, together, enclose the prime habitats and natural values of this extraordinary area.

Figure 72 : Significant Areas

(see also Map 2)



** also Oakview Woods (7) **

a) PROVINCIALLY SIGNIFICANT AREAS

1) Existing Nature Reserve This large parcel encloses a significant portion of the nationally significant high dune (parabolic and traverse) systems, with their complement of significant plants and vegetation; the area was defined in Van der Meer *et al*. (1978) and supported further by Hanna (1984).

2) Wintergreen/Witch-hazel Site The area of Lot 11, Concession 17 in the transvere dunes where these two very rare plant species and a number of other exceptional elements occur.

3) Northern Dune extension The natural extension of the existing Nature Reserve, containing important dune formations, rare flora and vegetation (including nationally significant elements) and an extensive area of natural landscape.

4) Post-Nipissing Raised Beaches The most extensive and least disturbed example of this landform complex, first proposed as having life science significance in Hanna (1981).

5) South Dune Extension and Powerline Bog Natural southward extension of the high parabolic and transverse dune systems, including the Nottawasaga River cut through them and a conifer swamp associated with the leeward face of the dune field (complete with graminoid fen clearings in the seepage areas).

6) Marl Lake Includes an exceptional wetland complex with a flora and fauna of high diversity and the only example of relict Nipissing shoreline in the Site District. It is cited as being significant in Bobbette (1975) and Hanna (1981) and is recommended for ANSI status (regional) by Hanna (1984).

7) Oakview Woods(North of Mosley Street) - The best example of rich Type 6 Cedar-Hemlock forest, supporting a diverse and uncommon flora, much of which is unknown elsewhere in Wasaga Beach Provincial Park. It is the only low beach ridge forest in reasonably natural condition in the Wasaga Beach area.

b) REGIONALLY SIGNIFICANT AREAS

These sites offer vegetation and flora that are available elsewhere in Site District 6-6 but which contribute significant regional elements and are the only example of their landform type or habitat in the vicinity of the park.

8) Nottawasaga River Spit (Undeveloped Beach 1) The only extensive area of regenerating/reasonably natural beach vegetation on

the Nottawasaga River shore in the park. It offers the potential for a restored Bay vegetation and flora, given time and active management.

9) Jacks Lake A complex of riparian forest (mostly Silver Maple swamp) and thicket swamps on the Nipissing lagoon flats, it supports many species known nowhere else in the Wasaga Beach Provincial Park area, including the only 'sugar bush' in the park area.

10) Jacks Lake Fen A floristically rich sloping seepage fen with numerous locally rare species of vascular plants and two exceptionally rare insect species.

CHAPTER 4 : PLANNING CONSIDERATIONS

1) EVALUATION OF LIFE SCIENCE RESOURCES

Five criteria are used to evaluate the Wasaga Provincial Park study area and Marl Lake ANSI candidate in terms of the contribution of the life science features and values within this land base, as per Macdonald (1986).

a) REPRESENTATION

A number of features and landscapes are represented well in the study area, including the following which are either the best examples of their feature in Site District 6-6, or are not exceeded in quality by other examples ;

- extensive transverse dune system
- extensive parabolic dune system
- post-Nipissing raised beaches
- sand prairies and barrens
- coastal Hemlock forest
- Nipissing relict fen-like marl meadows

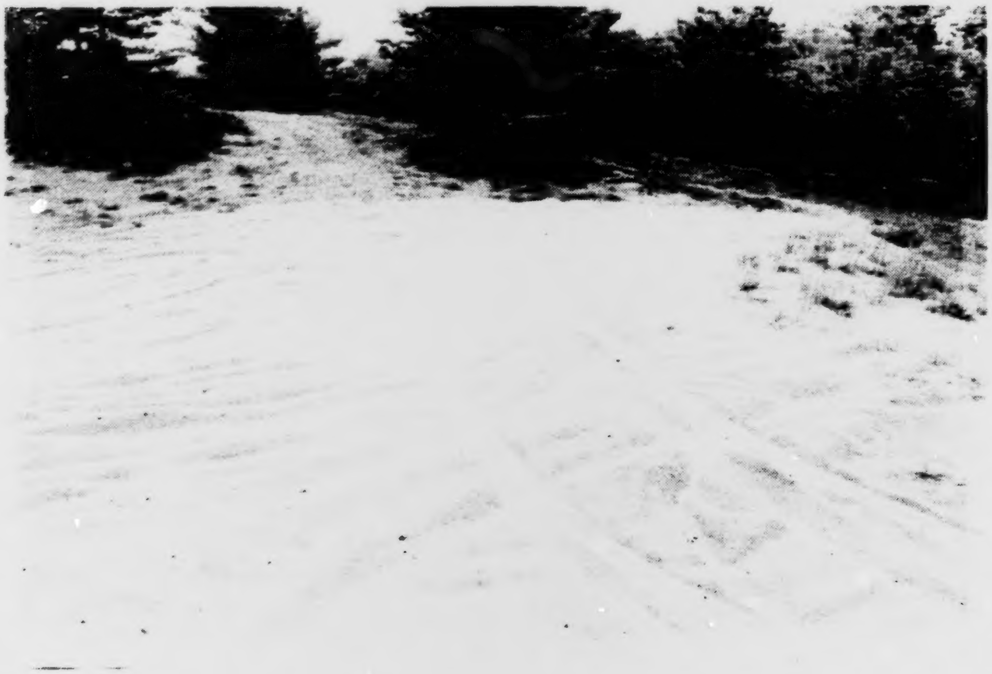
b) DIVERSITY

The study supports a large number of sand-based habitats and landforms; 17 Vegetation Types were identified including a number of provincially significant forms. The flora of the study area reflects this diversity with an exceptionally high total of almost 700 taxa of vascular plants.

c) CONDITION

The park landscape at and near Nottawasaga Bay has been severely disturbed and the natural values of this portion of the study area have been significantly compromised. A number of the natural elements of this area, however, are tolerant of severe disturbance and have persisted - albeit, as fragmentary examples. The dune lands inland have been logged for well over a century and have been exposed to extensive burning. The latter events may actually have enhanced the natural significance of the higher dunes, although the logging would not. Existing all-terrain vehicle traffic has impacted negatively on some sites, enlarging blow-outs and cutting slopes, without the seeding and soil preparation that natural disturbances usually provide (Figure 73). Riparian habitats along the Nottawasaga River are both in good natural condition (the Silver Maple swamp forests) and severely disturbed (scrubby, overgrowing hawthorn - dogwood scrub). While upland areas around Marl Lake have been all but destroyed by development, excellent and quite natural wetland habitats and vegetation remain and along the lake.

Figure 73 : ATV tracks cutting into sand dunes along a fire road in the parabolic dunes



d) ECOLOGICAL CONSIDERATIONS

The dune systems offer large and ecologically manageable examples of important life science (and earth science) values. They appear to have suffered from fire suppression that has been very efficient over the last 3 or 4 decades; sand prairies and barrens are growing in and forming Poverty-grass - Reindeer lichen heaths, to the detriment of rare and characteristic floral elements (Figure 74), and the shrub layer beneath maturing pine and pine - oak forests in becoming relatively dense. This extra shrubbery could pose, ironically, a serious fire threat. It provides enough extra fuel that should a small, ecologically tolerable (even desirable) fire begin, the burn may intensify to the point of creating severe vegetation and soil damage (loss of nutrients, seed banks, subterranean rhizomes and tubers, etc.).

The lowland lagoon habitats are of satifactory size and in interesting associations along the Jacks Lakes flood plain area (Figure 75) but are threatened by adjacent development (e.g. the

Figure 74 : Dry, old Poverty-grass - lichen heath in sand prairie habitat east of Powerline Road

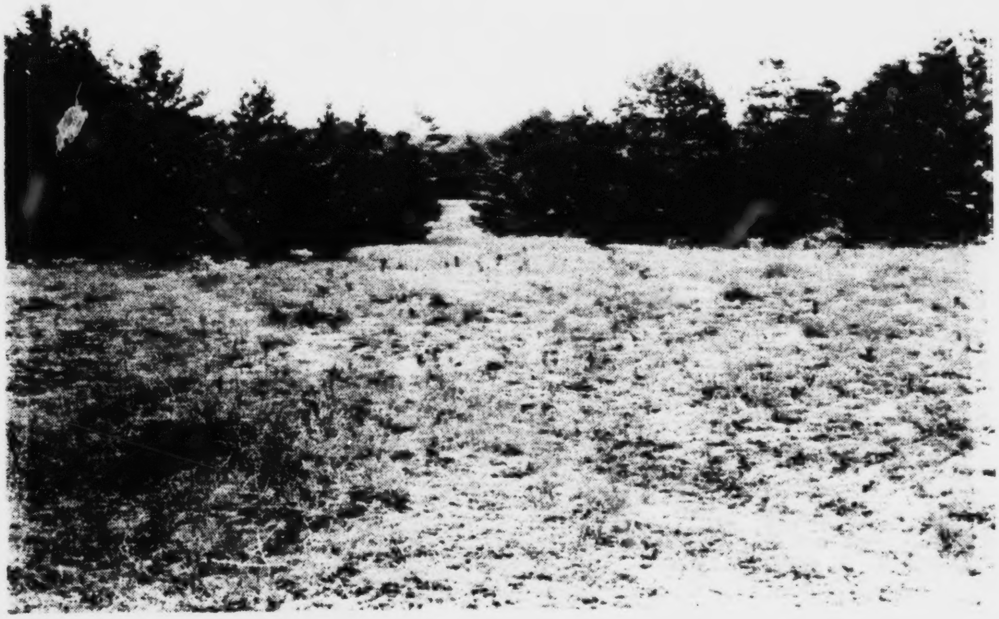


Figure 75 : Jacks Lake from outlet (facing east)

trailer park by the Jacks Lake fen).

While severely disturbed, the sand barren and back-beach scrub vegetation along the Nottawasaga Bay beaches is capable of regenerating in a natural state. Non-native plants able to survive in such habitats are rare, reducing the competitive threat. The Allenwood and New Wasaga Beach areas illustrate where excellent back-beach ridge top vegetation has developed within ten years of levelling by bulldozers. The area of Beach 1 farthest from the parking lot is also showing good regeneration in places and can continue if disturbance is not accelerated..

The Hemlock and Hemlock - Cedar forest in Oakview Woods is large enough and intact enough to sustain the rich and diverse flora found therein. Although the drainage ditch cut across the northern edge of the woods has reduced the water table somewhat and dried out the vegetation to some degree, the main floristic elements have survived. That cannot be said for Ross's Woods which, until a comparable drainage ditch was excavated, was similar in nature and significance to Oakview Woods. The severe drop in water table resulting there seems to have combined with forest disturbance to all but eliminate the important life science elements of the site.

The lower water levels of Marl (and Jack ?) Lake in comparision with the 1960's, if not before, is threatening the vegetation with elimination from competing drier-site species of shrubs and herbaceous plants. Although small, these habitats can be maintained if water table fluctuations follow a natural regime. The possible pollution of these habitats from adjacent developments, such as through fairway maintenance activities on the golf course, is a long-term concern.

e) SPECIAL FEATURES

The discussions in Chapter 3 : Significant Features establish how widespread unusual and even unique natural features are to be found within the Wasaga Beach Provincial Park and Marl Lake candidate ANSI study areas. The most important of these (endangered and/or nationally rare species, provincially significant habitat types, etc.) are represented within the boundary of the proposed Wasaga Beach Provincial Park nature reserve zones and the Marl Lake ANSI.

2) MANAGEMENT CONSIDERATION

The management considerations in the following discussion result from an evaluation of conclusions and recommendations offered in Carlisle et al. (1972), Van der Meer et al. (1978) and Hanna (1981) in light of the observations and conclusions of this study, and from independent conclusions developed during this investigation.

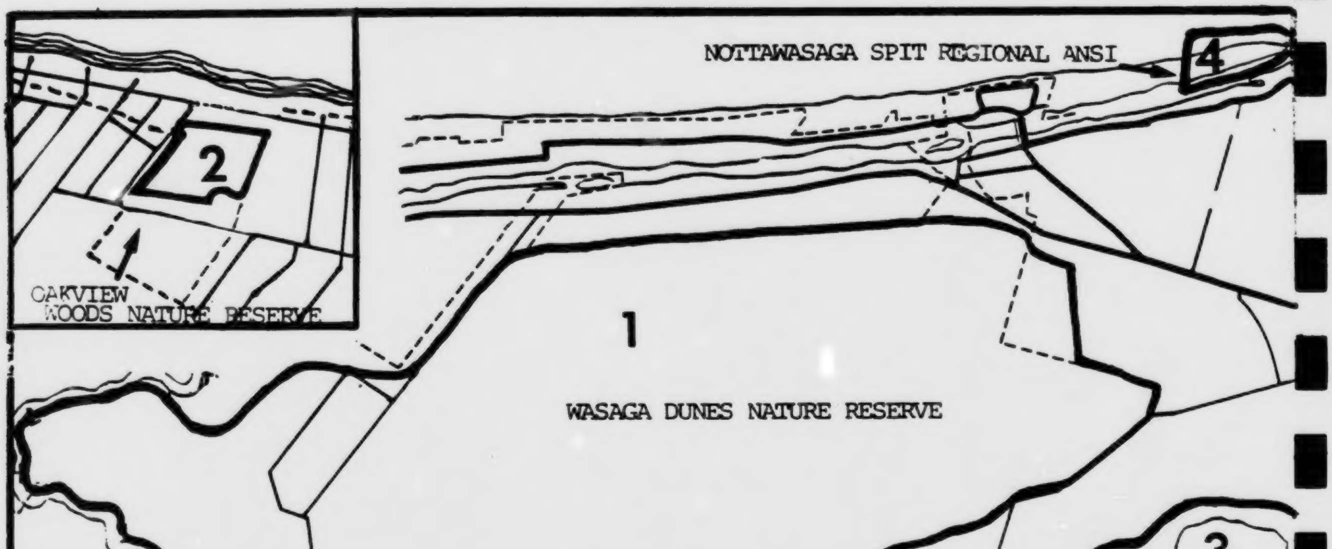
a) ZONING

Two provincially significant Areas of Natural and Scientific Interest should be established as nature reserve zones within Wasaga Beach Provincial Park (see Figure 76 and Map 2) :

1) Wasaga Dunes Nature Reserve To encompass all of the transverse dunes within the park, and to expand this area to include important post-Nipissing raised beaches and low dunes in the northwest. It includes the existing nature reserv reserve zone and areas 2,3,4 and 5 proposed in this study (see page 96).

2) Oakview Woods Nature Reserve To encompass the rich flora and vegetation of the coastal Hemlock-Cedar forests of this site north of Mosley Street (see Figure 20, page 25). That site supports the best remaining example of this coastal vegetation type in Site District 6-6 .

Figure 76 : Proposed Nature Reserves and ANSIs


NOTTAWASAGA SPIT REGIONAL ANSI
4
2
OAKVIEW
WOODS NATURE RESERVE
1
WASAGA DUNES NATURE RESERVE
3
MARL LAKE
ANSI
JACKS LAKE
ANSI
5
N
0
1km

Another area of provincial significant has been identified as an ANSI at Marl Lake, to protect the important wetland and shoreline values there (see Chapter 5).

Two areas are considered regionally significant; one is proposed as an area for appropriate management within the park, and the other as a Regional ANSI (see Figure 76 and Map 2):

4) Nottawasaga River Spit ANSI To encompass the undeveloped and mostly natural Bay shore beaches and shore vegetation. It supports the best remaining example of Bay beach in the Park. Because of fluctuating water levels, there is already a commitment to no development and no swimming on the spit. That commitment, as well as appropriate zoning should provide a basis for maintenance of more or less natural processes and vegetation development in that area.

5) Jacks Lake ANSI Encompasses the regionally significant vegetation values present and the large number of locally and regionally significant plant species, as well as the potentially nationally significant insect fauna in the Jacks Lake fen.

b) LAND ACQUISITION

The private lands within the proposed nature reserve areas (only in the Wasaga Dunes area; the others are on crown land) should be acquired for addition to the park in order to facilitate protective management over the largest possible area of high dunes.

Consideration should be given to the acquisition of the core area of the Jacks Lake fen and a buffer zone between it and adjacent development, to enable protective management for this delicate area to be effected.

Consideration should be given to acquisition of the remaining non-crown lands in the Marl Lake candidate ANSI.

A number of small lots west of the Nottawasaga River near the bay shore at Beach 6, the portion of Oakview Woods south of Mosley Street, and all of Ross's Woods, are of only moderate life science value. Ross's Woods was once an important area but vegetation disturbance and, more importantly, drainage of the wet areas, has diminished it as a natural area of significance. From a life science point of view these areas do not meet park nature reserve requirements. A site inspection of Ross's Woods also showed portions of it to be impacted by trails and dumping.

Land Use

The existing level of dispersed recreational activity within the high dunes (the proposed Wasaga Dunes ANSI) should not be exceeded. An evaluation of the possible impact of snowmobiles should be considered (see Further Research, below).

The existing unsurfaced and informal trail crossing Oakview Woods appears to be having no significant effect on the important natural values of the site and can be retained, but upgrading to hard surface, widening, etc. should only be considered (if at all) following an environmental assessment on a project-by-project basis. No further expansion of development into the woods should be permitted. A fence, with pedestrian gates at trailheads, would be useful in directing and limiting impact.

Existing conifer plantations in the dunes areas should be removed as they offer no life science values and constrain the extent of potentially important dune habitat available for significant elements.

d) FURTHER STUDIES

The most pressing research requirement is for a fire plan for the high dunes area. The long-term suppression of natural fire has apparently restricted the populations of rare species, including the highly significant Cirsium hillii, and may well be setting the stage for even greater impact in the near future. Such a plan should evaluate the natural cycle and nature of such burning, it should identify the requirements of the significant flora and the vegetation in the short term and it should identify a short and long term plan for expediting this requirement.

The impact of the existing level of snowmobile traffic on the dune system and vegetation of the proposed Wasaga Dunes ANSI should be undertaken to determine whether or not this non-conforming use (cf. Anonymous 1978) is having a significant environmental impact.

Continued investigation of the entomological richness of the Jacks Lake Fen should occur, preferably with personnel from the Agriculture Canada Biosystematics Research Institute (Ottawa); the two exceptional discoveries made during this study were accidental finds that suggest tremendous entomological potential here - perhaps at a national level of significance.

The long term needs for the significant vegetation of Marl Lake deserve evaluation and planning (see Chapter 5).

e) SUMMARY

The Wasaga Beach Provincial Park study area provides good representation of a number of exceptional life science features, particularly those related to the fossil sand dune system. That representation is presently limited, however, by the large proportion of the dune area not within Nature Reserve Zone or equivalent protection, and by the long-term effect of total fire suppression in this fire-dependent environment.

The main beach habitats along Nottawasaga Bay have been all but eliminated as significant natural areas by decades of intensive recreational activity. Surprisingly complete regeneration by an essentially native flora has occurred at the upper beach areas at Allenwood, New Wasaga and Beach 1 beaches, suggesting that some portions of the bay shore (e.g. the northern end of Beach 1, beyond the parking lots) will continue to revert to natural shoreline vegetation patterns if natural processes are allowed to dominate those areas. Recreational beach management is the primary operational concern in the spit area, but the commitment to non-development and no swimming on the spit means that dune management for recreation should at least be minimized there, and natural ecological processes to dominate.

Successful breeding of rare bird species in heavily utilized beach areas of similar character in Prince Edward Island and in Cape Cod, Massachusetts (e.g. Piping Plover, terns), offers hope that extirpated fauna of the Wasaga Beach shore could also be reintroduced.

The post-Nipissing lagoon flats in the Jacks Lake - Marl Lake area are not well represented within the existing park area or the Site District, although numerous significant and even unique natural features have been located there.

CHAPTER 5 : MARL LAKE ASSESSMENT

Marl Lake was identified in Carlisle et. al.(1972) as being very significant from a life science perspective. This was supported by Bobbette (1975), Hanna (1981) and Hanna (1984). The results of this inventory and assessment of the Wasaga Beach Provincial Park study area confirm that level of significance once more, supporting the previous designations of the area as possessing a provincial level of significance. While most of these data and analyses are found in the appropriate sections of the Wasaga Beach Provincial Park study, the site is sufficently separate (geographically) to warrant summation in a separate chapter.

Marl Lake is a relatively small area, approximately 150 ha in extent, and is situated on the silty sand post-Nipissing lagoon substrates that have been reworked and over-burdened by lacustrine deposits from the Nottawasaga River flood plain. It is shallow and marl bottomed, with sparse vegetation over much of its area and a dense ring of marsh, mixed aquatic and marl meadows on its margins. It is in this wetland vegetation that the primarly significance of the lake's life sciences is found.

1) RESOURCE INVENTORY

a) VEGETATION

Ten Vegetation Types were identified in the Marl Lake ANSI (as proposed by Hanna 1984) during this study. They are described in detail within the vegetation inventory of this study (see page 12) and can be summarized here as follows (see Figure 77):

Type 1 : Developed and/or Severely Disturbed Land

Dominated the west shore of the lake (the golf course) as well as by the north access (crop land); of no life science significance, beyond temporary habitat for Grasshopper Sparrows.

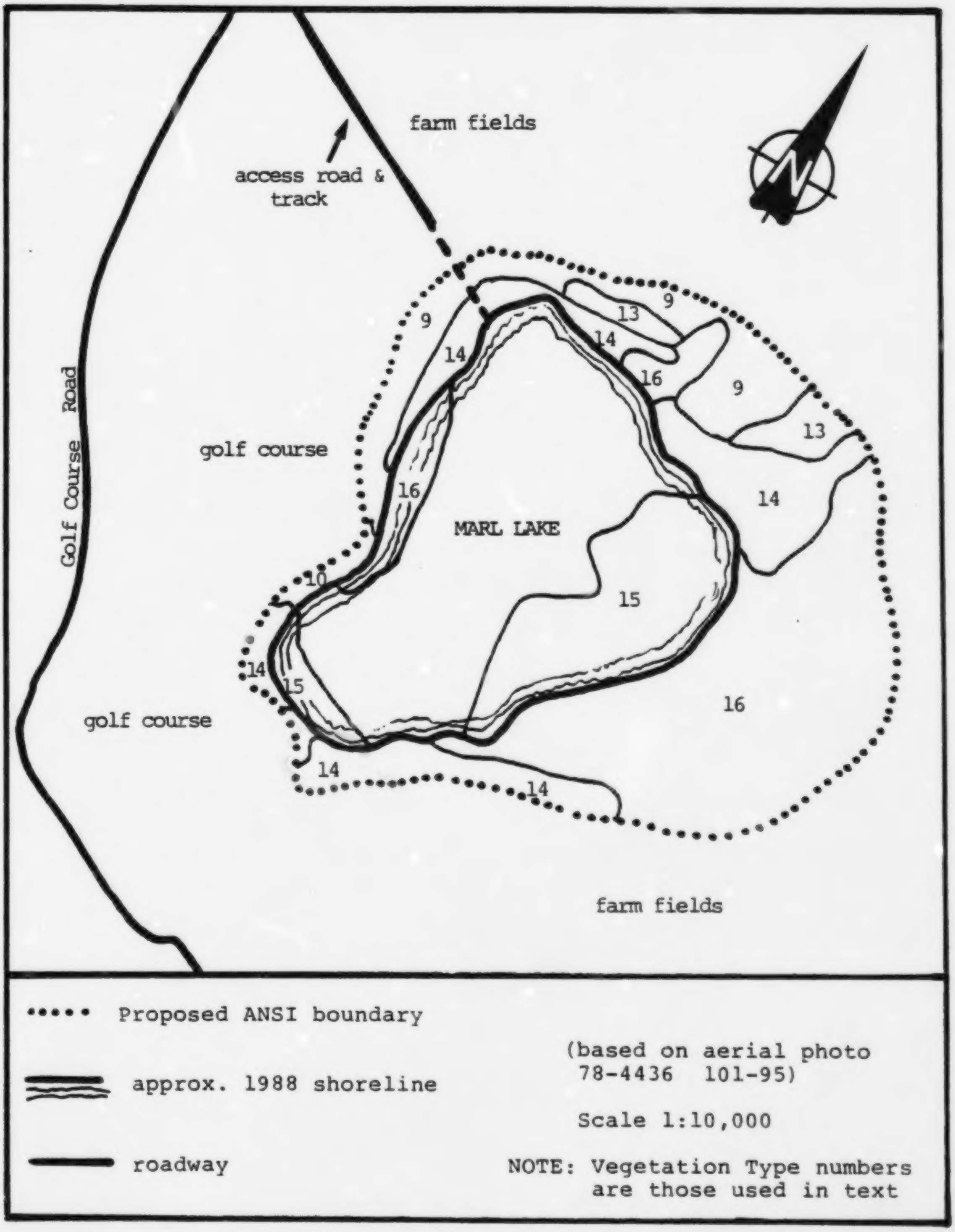
Type 3 : Upland Intolerant Deciduous Forest

Small areas of White Birch - Trembling Aspen forest in drier, sandy soils are found along the western edge of the wetland margin of the lake and in a larger block at the north end of the ANSI candidate; low level of life science significance.

Type 8 : Upland Meadows and Dry Thickets

Old pastureland now regenerating and overgrowing in various tall grass and shrub species; of minimal life science significance.

Figure 77 : Vegetation of Marl Lake ANSI


farm fields
access road & track
golf course
Golf Course Road
MARL LAKE
golf course
farm fields
9
13
9
14
14
16
9
13
16
14
15
10
14
15
16
14
14
N
Proposed ANSI boundary
approx. 1988 shoreline
roadway

(based on aerial photo 78-4436 101-95)

Scale 1:10,000

NOTE: Vegetation Type numbers are those used in text

Type 9 : Lowland Intolerant Deciduous Swamp Forest

A narrow belt of Black Ash swamp and Black Ash-Speckled Alder vegetation along the northern edge of the lake; supports several regionally siginicant plant species.

Type 10 : Lowland Intolerant Mixed Swamp Forest

A large area of Cedar - White Birch forest occurs in wet, peaty ground at the north end of the lake, in a narrow band between the upland forest and the open wetlands along the western shore, and as a small unit in the south; a number of interesting plant species are located here, although the vegetation is of limited significance in its own right.

Type 11 : Lowland Intolerant Coniferous Swamp Forest

A small area of Larch - Cedar forest at the south end, plus many small (unmapped) pockets of similar vegetation in the adjacent wetland forest vegetation, constitute a vegetation form that is of limited significance.

Type 14 : Wet Meadows

Consists of two major types. An extensive area of over-grown marsh is dominated by graminoids on the southeast side of Marl Lake and is of very limited life science interest. Another area, forming belts along the southern, western and northern shores, includes graminoid marl-based meadows with strong affinities to graminoid fen vegetation. This highly significant vegetation is typical of areas along the shores of Lake Huron in parts of Simcoe, Gray and Bruce Counties as is present here as a rare relict from postglacial Lake Nipissing shore vegetation.

Type 15 : Mixed (Floating and Emergent) Marsh

A large area on the eastern side of Marl Lake and many small patches elsewhere on the lake are dominated by a wide variety of interesting and significant calcicolous aquatic flora.

Type 16 : Shallow Marsh

The large marshes around the lake, especially on the east side, are highly significant, especially for the faunal elements of the ANSI.

b) FLORA

The rich diversity of aquatic habitats found at Marl Lake contributes a comparable diversity of floristic elements. Many, especially those of the marl meadows, have northern affinities. A number are widespread southern species. Most are calcicolous or lime-tolerant species, except in the narrow belt of coniferous and low mixed woods where some acidophylic species are found. A small area of fen-like vegetation at the south end of the lake that is dominated by Solidago ohioensis is a rare inland relict of the vegetation common along the unusual and declining shore meadows of southern Nottawasaga Bay near Collingwood which, in turn, represent prehistoric, post-glacial events.

The graminoid fen flora and wetland areas transitional with it offer the greatest diveristy in the Marl Lake ANSI.

c) BIRDS

Bird life has been studied in the Marl Lake area since the early years of the century (Harrington 1922 and 1924) and the lake has long been known as a breeding site for unusual marsh species as well as more typical marsh birds in Simcoe County, including Pied-billed Grebe, Least Bittern, American Bittern, Black Tern, Sora Rail, Marsh Wren and Sedge Wren (Devitt 1967). The low water levels of 1988, and at least the year before that, have reduced the breeding bird population and few of these species were observed this year, although habitat for them remains. The lake and its marshes appear to be important late season and migrational feeding ground for many insectivorous birds - e.g. 500-plus Tree Swallows on 1 September 1988 (see Figure 78).

d) OTHER FAUNA

Mammal and reptile and amphibian observations were few at Marl Lake and those species seen were typical and common taxa.

2) SIGNIFICANT RESOURCES

The following summarizes the significant features recorded from the Marl Lake ANSI; detailed descriptions can be found in Chapter 3 of this report (page 56).

a) SIGNIFICANT VEGETATION

The fen-like marl meadows (Type 14) are unique in the Wasaga Beach area and are most significant. They are unrepresented elsewhere in Site District 6-6, except for a tiny area in Awenda Provincial Park, nor are they represented elsewhere in Central Region.

Figure 78 : Tree Swallows swarming over a duck blind frame on Marl Lake

b) SIGNIFICANT FLORA

One species, the Beaked Spike-rush (Eleocharis rostellata), at Marl Lake, is nationally rare (see discussion on page 60). It is found in the Type 14 marl meadows at the north and south ends of Marl Lake.

Four species are considered to be regionally significant (viz, six or fewer records in Simcoe County) in Riley (1989). They are discussed in more detail in Chapter 3 at the pages indicated below:

Dichanthelium boreale	(page 70)
Carex livida	(page 72)
Carex pallescens	(page 74)
Geum laciniatum	(page 77)

A larger number of species are considered to be locally significant (viz, rare in the study area and/or biogeographically significant). The species observed at Marl Lake were :

Dichanthelium acuminatum var. lindheimeri
Carex gynocrates
Cladium mariscoides
Scirpus pendulus
Scirpus hudsonianus
Juncus brachycephalus
Proserpinaca palustris
Utricularia minor
Galium labradoricum
Solidago ohioensis

c) SIGNIFICANT FAUNA

Two provincially rare/significant bird species are known from Marl Lake :

1) Least Bittern (page 91) Formerly well established but recent history unknown.

2) Black Tern (page 92) Breeds, in large numbers in the past but less so recently; present during this study.

3) Yellow Rail (page 91) Possibly recorded (not confirmed) during this study.

Three regionally significant bird species are known from here:

1) Yellow-billed Cuckoo (page 93) Present here in 1988 and known to breed at Marl Lake since the 1950's.

2) Sedge Wren (page 93) Recorded from Marl Lake as early as the 1930's ; modern status unclear.

3) Grasshopper Sparrow (page 94) Breeding here in 1988 and present since at least the 1960's.

3) EVALUATION OF LIFE SCIENCE RESOURCES

Five criteria are used to evaluate the Marl Lake ANSI study area in terms of the contribution of the life science features and values within the unit, as per Macdonald (1986) .- see page 96.

a) REPRESENTATION

The post-Nipissing lagoon relict graminoid marl meadows are considered to be provinically significant (as a combination of earth and life science significance - cf. Carlisle *et al*. 1972)).

b) DIVERSITY

The floral and vegetation diversity (wetland systems) is high here, with a rich complement of calcicolous plant species being evident. Many species known from Marl Lake are unrecorded elsewhere in the Wasaga Beach Provincial Park study area.

c) CONDITION

The important wetland vegetation and flora seems atypically dry in 1988. Historical water levels were higher (e.g. the 1960's - Devitt 1967) and likely fluctuated significantly. Whether this low water is a natural response to the short term drought situation experienced in 1987 and 1988 or is the result of long term impacts from adjacent land use patterns has yet to be resolved.

d) ECOLOGICAL CONSIDERATIONS

The marsh and fen vegetation and flora are being challenged by drier-site species of vascular plants and shrubs and may be threatened if the low water levels remain too long. Conversely, long term high water resulting from damming of the outlet could result in the destruction of these habitat & botanical resources. Deeper water, for a period of time at least, will be required to increase breeding levels of some marsh birds considered to be significant here.

Water quality is a critical factor and in this light, the possible negative impact of run-off from adjacent developed sites (e.g. the golf course greens) could cause serious problems.

e) SPECIAL FEATURES

As identified in chapter 2 and in the previous pages of this chapter, the Marl Lake ANSI supports a wide and varied array of significant floral and faunal values at a local, regional and provincial level of significance.

4) MANAGEMENT CONSIDERATIONS

a) ZONING AND LAND USE

The Marl Lake ANSI area offers a set of natural values unrepresented elsewhere in Site District 6-6 and therefore warrants designation as an ANSI of provincial significance (Carlisle *et al*. 1972; Bobbette 1975; Hanna 1981 and 1984; this study). Consideration should be given to the acquisition of the remaining private lands to facilitate protective management.

The ANSI should be managed in such a way as to ensure the continued survival of the important wetland vegetation and the flora and fauna that depends upon it; a naturally fluctuating level of clean water is essential to this objective. The indirect and direct impact of hunting on game and non-game wildlife and on the health of the wetland environment of Marl Lake, should be considered in this regard as well.

b) FURTHER STUDIES

An investigation is required to determine the natural water level history and dynamics at Marl Lake and to set out a plan for maintaining or restoring that regime. An assessment of water quality and mechanisms for maintaining a high quality water supply should also be investigated at that time.

Further investigation of breeding birds, including the historical record at Marl Lake, is required in order to more completely assess the level of importance this site has for the several significant avian species recorded (or suspected) here.

APPENDIX 1 : CHECKLIST OF VASCULAR PLANTS

The following lists the 674 taxa of vascular plants recorded from Wasaga Beach Provincial Park and the adjacent study area considered in this study (viz, Jacks Lake and Marl Lake ANSI areas).

The taxa are listed is typical checklist order (cf. Fernald 1950). Introduced (non-native) taxa are indicated by an asterisk (*) preceeding their name. The status of each is noted in general terms (reflecting that taxon's observability) by letter codes, as follows:

C - common U - uncommon R - rare

A number in brackets following some status codes indicates the text page at which a discussion of that significant taxon may be found. The habitat of each taxon is noted by one or more numbers thereafter, co-inciding with the numbering system of the Vegetation Types in this study (e.g. 4,5 = Upland Intolerant mixed and coniferous forest types). The herbarium at which a voucher for each taxon is preserved is noted at the far right of the list. The Royal Ontario Museum herbarium (TRT) has the largest collection of Wasaga Beach material and is considered the primary collection. Other herbaria are noted only if no TRT voucher exists. Similarly, sight records are noted only if no voucher exists. (Appendix 2 lists all of the vascular plant collections made during this study). A list of the acronyms used to signify particular herbaria and observers can be found at the end of the checklist. And finally, the level of significance is indicated for the appropriate taxa, again by number code, as follows :

Loc - Local Reg - Regional Nat - National

Nomenclature follows Riley (1989), with occasional diversions for new taxa or more appropriate nomenclature.

Lycopodiaceae

Lycopodium annotinum L.	U		6,11	DFB, RB	
L. clavatum L. var. clavatum	U		4,5	TRT	
L. dendroideum Michx.	U		3,4	DFB, RB	
L. digitatum A.Br.	C		3,4,5	DFB, RB	
L. Xhabereri House (L. digitatum X tristachyum)	R	(68)	5	OAC	Reg
L. lucidulum Michx.	U		6,11	TRT	
L. obscurum L.					
var. isophyllum Hickey	C		4,5	OAC, WPP	
var. obscurum	R	(68)	5	OAC	Reg
L. tristachyum Pursh	C		5	WPP	

Selaginellaceae

Selaginella eclipes Buck	U		1,14,17	TRT	
S. rupestris (L)Spring	R		7	RB	

Equisetaceae

Equisetum arvense L.	C	1,8	TRT
E. fluviatile L.	U	15,16	DFB, RB
E. hyemale L.	C	1,2,7,8	TRT
E. palustre L.	R	(9?)	RB
E. scirpoides Michx.	U	6,11	TRT
E. sylvaticum L.	U	9,10	TRT
E. variegatum Schleich.	C	1,14	TRT

Ophioglossaceae

Botrychium matricariifolium A.Br.	R	6	RB
B. multifidum (Gmel.)Rupr.	U	8,4	TRT
B. virginianum (L.)Sw.	C	3,4,11	TRT

Osmundaceae

Osmunda cinnamomea L.	R	(9?)	RB
O. regalis L. var. spectabilis (Willd.)G.	U	9,11	DFB, RB

Dennstaedtiaceae

Pteridium aquilinum (L.)Kuhn var. latisculum (Desv.)Underw.	C	1,2,3,4,5,6,7,8	TRT

Adiantaceae

Adiantum pedatum L.	R	6	WPP

Aspleniaceae

Athyrium filix-femina (L.)Roth var. michauxii (Spreng.)Fern.	C	3,9,11	TRT
Cystopteris bulbifera (L.)Bernh.	U	6,11	DFB
Dryopteris carthusiana (Vill.)Fuchs	C	9,11	TRT
D. cristata (L.)Gray	U	6,11	TRT
D. intermedia (Willd.)Gray	C	3,4,10	TRT
D. marginalis (L.)Gray	R	6	TRT
D. Xtriploidea Wherry (D. carthusiana x intermedia)	R	6	DFB
Gymnocarpium dryopteris (L.)Newm.	U	6,11	TRT

Matteuccia struthiopteris (L.)Todaro	C		9	TRT	
Onoclea sensibilis L.	C		9,10	TRT	
Polystichum acrostichoides (Michx.)Schott	R		Oakview	TRT	
Thelypteridaceae					
Thelypteris palustris (Salisb.)Schott	C		9,10,14, 17	TRT	
Polypodiaceae					
Polypodium virginianum L.	R		(6?)	RB	
Taxaceae					
Taxus canadensis Marsh.	C		3,6	DFB	
Pinaceae					
Abies balsamea (L.)Mill.	C		10,11	DFB, RB	
Larix laricina (Du Roi)K. Koch	U		11,12	DFB, RB	
Picea glauca (Moench)Voss	C		2,3,4	DFB, RB	
P. mariana (Mill.)BSP.	U		11	DFB, RB	
Pinus resinosa Ait.	C		4,5	WPP	
P. strobus L.	C		4,5	DFB, RB	
Tsuga canadensis (L.)Carr.	U		6	DFB, RB	
Cupressaceae					
Juniperus communis L. var. depressa Pursh	U		2,5,7,7	DFB, RB	
J. virginiana L.	R	(84)	7	TRT	Loc
Thuja occidentalis L.	C		1,4,6, 10,11	TRT	
Typhaceae					
Typha latifolia L.	C		14,16,17	DFB, RB	
Sparganiaceae					
Sparganium americanum Nutt.	U		16	DFB	
S. eurycarpum Engelm.	UU		16	DFB, RB	
S. minimum (Hartm.)Fries	R	(68)	9	TRT	Reg

Potamogetonaceae					
Potamogeton friesii Rupr.	R	(68)	15	TRT	Reg
P. illinoensis Morong	U		15	TRT	
P. natans L.	U		15,16	DFB	
P. pectinatus L.	U		15	DFB, RB	
P. richardsonii (A. Benn.)Rydb.	U		15	DFB	
Najadaceae					
Najas flexilis (Willd.)R. & S.	U		15	DFB	
Juncaginaceae					
Triglochin maritimum L.	R	(84)	17	TRT	Loc
T. palustre L.	R	(84)	14	TRT	Loc
Alismataceae					
Alisma triviale Pursh	U		14,15	WPP	
Sagittaria latifolia Willd.	C		16	DFB, RB	
Hydrocharitaceae					
Elodea canadensis Michx.	C		16	DFB	
Vallisneria americana Michx.	U		15,16	DFB, RB	
Poaceae					
*Agropyron repens (L.)Beauv.	C		1,2,3	TRT	
A. trachycaulum (Link)Malte					
var. glaucum (Pease & Moore)Malte	U		7,8	DFB, RB	
var. novae-angliae (Scribn.)Fern.	C		7,8	TRT	
var. unilaterale (Cass.)Malte	R		7	TRT	
Agrostis gigantea Roth	U		1,8	TRT	
A. scabra Willd.	U		8	TRT	
A. stolonifera L.	U		14	TRT	
Alopecurus aequalis Sobol	R	(70)	9	TRT	Reg
Ammophila breviligulata Fern.	C	(84)	7	TRT	Loc
Andropogon gerardii Vitm.	C	(84)	1,7,8	TRT	Loc
A. scoparius Michx.	C		1,7,8	TRT	
Bromus ciliatus L.	U		5,8	TRT	
*B. inermis Leyss.	U		1	TRT	
B. kalmii A. Gray	R		5,8	TRT	

*B. tectorum L.	U		1,7	TRT	
Calamagrostis canadensis (Michx.)Beauv.	C		14,16	DFB, RB	
C. stricta (Timm)Koeler spp. inexpansa (A.Gray)Greene	U	(84)	7	TRT	Loc
Cinna latifolia (Goepp.)Griseb.	R		11,6	TRT	
*Dactylis glomerata L.	C	1,7	1,7	TRT	
Danthonia spicata (L.)R.&S.	C		7,8	TRT	
Deschampsia flexuosa (L.)Beauv.	C		4,5,8	TRT	
Dichanthelium boreale (Nash)Freckmann	R	(70)	(14?)	RB	Reg
D. depauperatum (Muhl.)Gould	U		5	TRT	
D. acuminatum (Swartz) Gould & Clarke var. implicatum (Scribn.) G. & C.	C		1,8,14	TRT	
var. lindheimeri (Nash) G. & Cl.	R	(84)	14	TRT	Loc
D. latifolium (L.)Harv.	R		4	TRT	
D. sabulorum (Lam.)Gould & Clarke	U	(84)	5,8	TRT	LOC
D. xanthophysum (Gray)Freckmann	U		5,8	TRT	
*Digitaria ischaemum (Schreb.)Schreb.	U		1	DFB	
Echinochloa wiegandii (Fass.)McNeil &	R		1	DFB	
Elymus canadensis L.	C		5,7,8	TRT	
E. virginicus L.	U		4,9	TRT	
Eragrostis frankii Steudel	R	(70)	1	TRT	Reg
*Festuca pratensis Huds.	C		1	DFB	
F. rubra L.	C		1,4,8	TRT	
F. saximontana Rydb.	U	(70)	7,8	TRT	Reg
*F. trachyphylla (Hackel)Krajina	U		1	TRT	
Glyceria borealis (Nash)Batch.	R		9	TRT	
G. grandis S. Wats.	U		14	DFB	
G. striata (Lam.)Hitchc.	C		9,12,13	DFB	
Hierochloe odorata (L.)Beauv.	R	(85)	(7?)	RB	Loc
Leersia oryzoides (L.)Sw.	C		13,14	DFB	
*Lolium perenne L.	R		1	TRT	
Milium effusum L.	R		(3?)	RB	
* Miscanthus sacchariflorus (Maxim.)Hack.	R		1	TRT	
Muhlenbergia glomerata (Willd.)Trin.	U		14,17	TRT	
M. mexicana (L.)Trin. var. filiformis (Willd.)Scribn.	R	(85)	4	TRT	Loc
var. mexicana	C		3,4,5	DFB, RB	

M. schreberi Gmel.	R	(90)	1	TRT	Reg
Oryzopsis asperifolia Michx.	C		3,4,	TRT	
O. pungens (Spreng.)Hitchc.	C		4,5	TRT	
Panicum capillare L.	C		1	TRT	
*P. milaceum L.	R		1	DFB	
P. virgatum L.	C		1,5,7,8	TRT	
Phalaris arundinacea L.	C		13, 14	DFB, RB	
*Phleum pratense L.	C		1,8	DFB, RB	
Phragmites australis (Cav.)Trin.	U		14,16	DFB, RB	
Poa annua L.	U		1	DFB	
P. compressa L.	C		1,5,7,8	TRT	
P. palustris L.	U		9,13	DFB	
P. pratensis L. ssp. agassizensis (B.&L.)T. & Mc.	R		7	TRT	
P. pratensis L. ssp. pratensis	C		1,5,8	TRT	
Schizachne purpurascens (Torr.)Sw.	R		(4?)	RB	
*Setaria glauca (L.)Beauv.	C		1	DFB	
*S. viridis (L.)Beauv.	C		1	DFB	
Sorghastrum nutans (L.)Nash	C	(85)	1,7	TRT	Loc
Sphenopholis intermedia (Rydb.)Rydb.	R		14	RB	
Sporobolus cryptandrus (Torr.)Gray	C		1,7	TRT	
S. neglectus Nash	R	(71)	1	TRT	Reg
S. vaginiflorus (Torr.)Wood var. inaequalis Fern.	U		1	TRT	
Trisetum melicoides (Michx.)Trin. var. majus(A. Gray)Hitchc.	R	(72)	7	RB	Reg

Cyperaceae

Carex arctata Boott	U		3,4	TRT	
C. aurea Nutt.	U		1,6,14	TRT	
C. bebbii (Bailey)Fern.	C		9	DFB	
C. blanda Dew.	R		3	TRT	
C. brunnescens (Pers.)Poir.	R		(11?)	RB	
C. buxbaumii Wahl.	U		14,17	TRT	
C. capillaris L.	U	(72)	6	TRT	Reg
C. castanea Wahl.	C		4,6	TRT	
C. communis Bailey	U		3	TRT	
C. crinita Lam.	U		9,13	DFB	
C. cristatella Britt.	U		9,13	DFB	

C. deweyana Schw.	R		3,4	DFB	
C. diandra Schrank	R		17	DFB	
C. disperma Dew.	U		6,11	DFB, RB	
C. eburnea Boot	C		6,8,14	TRT	
C. flava L.	U		8,14,17	TRT	
C. foenea Willd.	U	(72)	5,7	DFB	Reg
C. gracillima Schw.	U		3,4	DFB	
C. granularis Muhl.	U		8	TRT	
C. grayii Carey	R	(72)	12	RB	Reg
C. gynocrates Drejer	U	(85)	14,17	TRT	
C. hystericina Muhl.	U	9,14	9,14	DFB	
C. interior Bailey	C		14,17	TRT	
C. intumescens Rudge	C		6,9,12	DFB, RB	
C. lacustris Willd.	R		14	(J.L. Riley)	
C. lasiocarpa Ehrh.	C		14,17	DFB, RB	
C. leptalea Wahl.	R		6,11	DFB	
C. limosa L.	U		14,17	TRT	
C. livida (Wahl.)Willd.	R	(72)	14.17	TRT	Reg
C. lucorum Link	R	(72)	8	TRT	Reg
C. lupulina Willd.	C		12	TRT	
C. muhlenbergii Schk.	U	(85)	7,8	TRT	Loc
C. ormostachya Wieg.	R		(?)	RB	
C. pallescens L.	R	(74)	13	DFB	
C. peckii Howe	R		3	DFB	
C. pedunculata Muhl.	U		3,4	TRT	
C. pensylvanica Lam.	C		5,8	TRT	
C. platyphylla Carey	R	(74)	3	TRT	
C. prairea Dew.	R		14	RB	
C. pseudocyperus L.	R		(14?)	RB	
C. radiata (Wahl.)Dew.	R		3	TRT	
C. retrorsa Schwein.	C		9,14	WPP	
C. rostrata Stokes	U		12	TRT	
C. rugosperma Mack.	C		5,8	TRT	
C. stipata Muhl.	U		9,13	DFB	
C. tenera Dew.	R		11	TRT	
C. trisperma Dew.	R		6,11,17	DFB, RB	
C. tuckermanii Boott	U		12	TRT	

C. umbellata Willd. (s. st.)	R	(74)	4	TRT	Reg
C. vesicaria L.	R		(16?)	RB	
C. vulpinoidea Michx.	U		9,14	DFB	
Cladium mariscoides (Muhl.)Torr.	U	(85)	14	DFB, RB	Loc
Cyperus esculentus L.	R		16	TRT	
C. filiculmis Vahl.	U		1,7	TRT	
C. houghtonii Torr.	U	(58)	7,8	TRT	Nat
C. rivularis Kunth	R		16	TRT	
Dulichium arundinaceum (L.)Britt.	R		16	TRT	
Eleocharis acicularis (L.)R.&S.	U		14,16	TRT	
E. elliptica Kunth	R	(85)	17	TRT	Loc
E. erythropoda Steud.	U		1,14	TRT	
E. rostellata Torr.	R	(60)	14	TRT	Nat
Eriophorum viridi-carinatum (Engelm.)Fern.	U		14	TRT	
Rhynchospora alba (L.)Vahl	R		17	TRT	
Scirpus acutus Muhl.	U		16	DFB, RB	
S. americanus Pers.	C		7,16	TRT	
S. atrovirens Willd.	U		14	TRT	
S. cyperinus (L.)Kunth	U		14	TRT	
S. hudsonianus (Michx.)Fern.	R	(85)	17	TRT	Loc
S. pendulus Muhl.	R	(85)	13	TRT	Loc
S. validus Vahl	C		15,16	DFB, RB	

Aracaeae

Arisaema triphyllum (L.)Schott	U		12,13	DFB, RB	

Lemnaceae

Lemna minor L.	U		9,16	DFB, RB	

Pontederiaceae

Pontederia cordata L.	U		15,16	DFB, RB	
Zosterella dubia (Jacq.)Sm.	U		15	DFB	

Juncaceae

Juncus articulatus L.	U		14	TRT	
J. balticus Willd.	C		14,16,17	TRT	
J. brachycephalus (Engelm.)Buch.	R	(36)	14,17	TRT	
J. brevicaudatus (Engelm.)Fern.	U		14	TRT	
J. bufonius L.	U		16	TRT	
*J. compressus Jacq.	U		1,16	TRT	
J. dudleyi Wieg.	U		1,8	DFB, RB	
J. effusus L.	R		17	DFB	
J. nodosus L.	U		16	DFB	
J. tenuis Willd.	U		1,3,4	DFB	

Liliaceae

*Asparagus officinalis L.	R		8	DFB	
Clintonia borealis (Ait.)Raf.	C		4,6,11	TRT	
*Convallaria majalis L.	R		1,6	DFB	
Erythronium americanum Ker	U		3,4	RB	
Lilium michiganense Farw.	R	((86)	(12?)	RB	Loc
L. philadelphicum L.	U		4,5,8	TRT	
Maianthemum canadense Desf. var. canadense	C		3,4,5, 6,11	TRT	
var. interior Fern.	U	(74)	5	TRT	
Medeola virginiana L.	R		4	DFB	
Polygonatum pubescens (Willd.)Pursh	U		3,4	DFB, RB	
Smilacina racemosa (L.)Desf.	U		3,4,5	TRT	
S. stellata (L)Desf.	C		8,14,17	TRT	
S. trifolia (L.)Desf.	R		17	TRT	
Streptopus roseus Michx.	U		4,6	TRT	
Tofieldia glutinosa (Michx.)Pers.	R	(86)	(14?)	RB	
Trillium cernuum L.	R		9,13	TRT	
T. erectum L.	U		3,4	TRT	
T. grandiflorum (Michx.)Salisb.	U		3,4	TRT	
Uvularia grandiflora Sm.	U		(3?)	RB	

Smilacaceae

Smilax herbacea L.	R		4	WPP	

Iridaceae

Iris versicolor L.	C		14,15,16	TRT	
Sisyrinchium montanum Greene	U		8,14	TRT	

Orchidaceae

Calapogon tuberosus (L.)BSP.	R		17	TRT	
Calypso bulbosa (L.)Oakes	R	(75)	6	TRT	Loc
Corallorhiza maculata (Raf.)Raf.	R		6	TRT	
C. striata Lindl.	R		6	TRT	
C. trifida Chat.	R		5,6	TRT	
Cypripedium acaule Ait.	C		4,5,6,11	TRT	
C. arietinum R.Br.	R	(86)	6	TRT	Loc
C. calceolus L. var. pubescens (Willd.)Corr.	U		4,9,11	TRT	
C. reginae Walt.	U		9,11	TRT	
*Epipactis helleborine (L.)Crantz	C		1,2,4,6,8	TRT	
Goodyera oblongifolia Raf.	U	(83)	6	TRT	
G. oblongifolia Raf. X tesselata Lodd.	R	(75)	6	TRT	
G. pubescens (Willd.)R.Br	R		6	RB	
G. repens (L.)R.Br. var. ophioides Fern.	U		6,11	TRT	
G. tesselata Lodd.	U		6	TRT	
Liparis loeselii (L.)Rich.	R		17	TRT	
Listera convallarioides (Sw.)Torr.	R		11	TRT	
L. cordata (L.)R.Br.	R		11	RB	
Malaxis monophylla (L.)Sw.	R		(11?)	RB	
M. unifolia Michx.	R		4	TRT	
Platanthera clavellata (Michx.)Luer	R		9	RB	
P. hookeri (Torr.)Lindl.	U	(75)	4	TRT	Reg
P. hyperborea (L).Lindl.	R		17	DFB	
P. obtusata (Banks ex Pursh)Lindl.	R		11	DFB, RB	
P. orbiculata (Pursh)Lindl.	R	(75)	5,6	DFB, RB	
P. psycodes (L.)Lindl.	R		(12?)	RB	
Spiranthes cernua (L)Rich.	R		14	DFB	
S. lacera (Raf.)Raf. var. lacera	R		8	RB	
S. romanzoffiana Cham.	U		14,17	DFB	

Salicacaeae

*Populus alba L.	U		1	DFB	

P. balsamifera L.	C		9,13	TRT	
P. deltoides Marsh.	U		7	DFB	
P. grandidentata Michx.	C		4	DFB, RB	
P. tremuloides Michx.	C		3,4,8	TRT	
Salix bebbiana Sarg.	C		13,14	TRT	
S. candida Muhl.	U		14,17	TRT	
S. cordata Michx.	C	(75)	7	TRT	Reg
S. discolor Muhl.	U		13	TRT	
S. eriocephala Michx.	C		7	CAN	
S. exigua Nutt.	C		7	CAN	
S. humilis Marsh.	U		4,5	TRT	
S. lucida Muhl.	C		7,14	DFB	
*S. nigra L.	U		10	CAN	
S. petiolaris Sm.	U		13,14	DFB	
S. serissima (Bailey)Fern.	R		14,17	TRT	
Myricaeae					
Comptonia peregrina (L)Coult.	C		5,7,8	TRT	
Betulaceae					
Alnus rugosa (Du Roi)Spreng.	C		9,10	TRT	
Betula alleghaniensis Britt.	U		9,10	DFB, RB	
B. papyrifera Marsh.	C		3,4,8	DFB	
Fagaceae					
Quercus alba L.	R		4	RB	
Q. macrocarpa Michx.	U		4	DFB, RB	
Q. rubra L.	C		3,5	WPP	
Ulmaceae					
Ulmus americana L.	C		9,10	TRT	
U. rubra Muhl.	R	(36)	4	TRT	Loc
Urticaceae					
Laportea canadensis (L.)Wedd.	U		12	DFB	
Pilea pumila (L.)Gray	U		12	TRT	
Urtica dioica L. ssp. gracilis (Ait.)Seland.	U		8,9	DFB	

Loranthaceae

Arceuthobium pusillum Peck	R	(86)	11	RB	Loc

Santalaceae

Comandra umbellata (L.)Nutt.	C		4,5,7,8	TRT	

Aristolochiaceae

Asarum canadense L.	R		3	DFB	

Polygonaceae

* Polygonum aviculare L.	U		1	TRT	
P. cilinode Michx.	U		1,8	DFB	
P. hydropiper L.	R		9	DFB	
P. hydropiperoides Michx.	U	(86)	14,16	TRT	Loc
P. lapathifolium L.	R		16	DFB	
*P. persicaria L.	U		1	TRT	
*Rumex acetosella L.	C		1,7,8	TRT	
*R. crispus L.	C		1,8	TRT	
*R. obtusifolius L.	R		9	TRT	
R. orbiculatus Gray	R		14,17	TRT	
R. verticillatus L.	U	(87)	16	DFB, RB	

Chenopodiaceae

*Chenopodium album L.	R		1	DFB	
C. gigantospermum Aellen	R		1	DFB	
*C. strictum Roth var. glaucophyllum (Aellen)Wahl.	R		1	DFB	
Salsola pestifer A.Nels.	U				

Amaranthaceae

Amaranthus albus L.	R		1	TRT	
A. tuberculatus (Moq.)Sauer	U	(76)	12,16	TRT	Reg

Caryophyllaceae

Arenaria serpyllifolia L.	U		1,8	TRT	
*Cerastium fontanum Baumg.	C		1,8	WPP	
*Dianthus plumarius L.	C		1	DFB	

*Lychnis coronaria (L.)Desr.	R	1	RB
Silene antirrhina L.	R	(8?)	RB
*S. noctiflora L.	R	1	DFB
*S. vulgaris (Moench)Garcke	C	1,8	TRT

Nymphaeaceae

Nuphar variegatum Dur.	C	15,16	DFB
Nymphaea odorata Ait.	U	15	DFB
N. tuberosa Paine	U	15	DFB

Ceratophyllaceae

Ceratophyllum echinatum	C	15	DFB

Ranunculaceae

Actaea pachypoda Ell.	R		3,4	DFB	
A. rubra (Ait.)Willd.	C		4	TRT	
Anemone canadensis L.	R		9	TRT	
A. cylindrinca Gray	C		5,7	TRT	
A. multifida Poir.	C	(87)	8	TRT	Loc
A. quinquefolia L.	R	(84)	(5?)	RB	Loc
A. virginiana L.	C		5,8	TRT	
Aquilegia canadensis L.	U		3,4,5,8	TRT	
Caltha palustris L.	C		9	TRT	
Clematis virginiana L.	U		3,9	DFB	
Coptis trifolia (L.)Salisb.	C		6,11	TRT	
Hepatica acutiloba DC.	R		3	TRT	
Ranunculus abortivus L.	U		10,11	TRT	
*R. acris L.	C		1,8	TRT	
R. flabellaris Raf.	U		15,16	DFB, RB	
R. hispidus Michx. var. caricetorum (Greene)Duncan	R		(?)	RB	
R. recurvatus Poir.	U		3,11	TRT	
T. pubescens Pursh	C		9,13,14,17	TRT	

Berberidaceae

*Berberis vulgaris L.	R	4	TRT

Caulophyllum thalictroides	R	(87)	3		Loc
Menispermaceae					
Menispermum canadense L.	R	(87)	12	TRT	Loc
Papaveraceae					
Sanguinaria canadensis L.	R		3	DFB	
Brassicaceae					
*Alyssum alyssoides (L.)L.	R		1,7	TRT	
Arabis drummondii Gray	R	(76)	(7?)	RB	Reg
A. glabra (L.)Bernh.	U		1,7,8	DFB, RB	
A. holboelii Hornem.	C	(87)	1,7,8	TRT	Loc
A. lyrata L.	C	(87)	1,7,8	TRT	Loc
*Barbarea vulgaris L.	R		1	WPP	
Cakile edentula (Bigel.)Hook.	U	(76)	7	TRT	Reg
*Camelina microcarpa Andz. ex DC.	R		1	TRT	
*Capsella bursa-pastoris (L.)Medic.	C		1	TRT	
Cardamine pensylvanica Muhl.	R		9	DFB	
Dentaria diphylla Michx.	R		(3?)	RB	
*Erucastrum gallicum (Willd.)Schulz	R		1	TRT	
*Erysimum cheiranthoides L.	C		1,8	DFB, RB	
*Lepidium campestre (L.)R.Br.	U		1	TRT	
*L. densiflorum Schrad.	C		1	TRT	
*Nasturtium microphyllum (Boenn.)Reich.	U		1	TRT	
Rorippa palustris (L.)Besser ssp.fernaldiana (Butters & Abbe)Jonsell	U		16	TRT	
*Sinapis arvensis L.	R		1	DFB	
*Sisymbrium officinale (L.)Scop.	U		1	DFB	
*Thlaspi arvense L.	R		1	WPP	
Sarraceniaceae					
Sarracenia purpurea L.	U		17,	DFB, RB	
Droseraceae					
Drosera rotundifolia L.	U		14,17	DFB, RB	
Crassulaceae					
*Sedum acre L.	U		1	DFB, RB	
*S. spurium Bieb.	R		1	TRT	

*S. telephium L.	R		1	TRT	

Saxifragaceae

Mitella diphylla L.	R		3	DFB	
M. nuda L.	U		6,11	TRT	
Parnassia glauca Raf.	U		1,6	TRT	
P. parviflora DC.	R	(87)	(7?)	RB	Loc
Tiarella cordifolia L.	C		6,11	TRT	

Grossulariaceae

Ribes cynosbati L.	R		3,13	DFB	
R. lacustre (Pers.)Poir.	R		11	DFB	
R. triste Pall.	U		13	TRT	

Hamamelidaceae

Hamamelis virginiana L.	R	(77)	4	TRT	Reg

Rosaceae

Agrimonia gryposepala Wallr.	U		3,4	DFB	
Amelanchier arborea (Michx.f.)Fern.					
ssp. arborea	R	(87)	3	TRT	Loc
ssp. laevis (Wieg.)McKay	U		3,4	TRT	
A. sanguinea (Pursh)DC.	U		4	DFB	
A. spicata K.Koch var. spicata	U		4,8	DFB	
Crataegus flabellata (Spach)Kirchner	U	(77)	8	WO	Reg
C. punctata Jacq.	U		8	WO	
Fragaria vesca L.	R		(4?)	RB	
F. virginiana Dcne.	C		1,3,4,5,8	TRT	
Geum aleppicum Jacq.	C		8	TRT	
G. laciniatum Murr.	R	(77)	9,14	TRT	Reg
G. rivale L.	R		17	TRT	
*Malus domestica Borkh.	U		1,8	DFB	
Physocarpus opulifolius (L.)Maxim.	C		7,8	TRT	
Potentilla anserina L.	U		7	TRT	
*P. argentea L.	R		1	TRT	
P. fruticosa L.	C		7,14,17	TRT	
*P. norvegica L.	U		1	WPP	

P. palustris (L.)Scop.	U		14	TRT	
Prunus pensylvanicus L.f.	C		5,8	TRT	
P. pumila L. var. pumila	C	(87)	7	TRT	Loc
P. susquehanae Willd.	R		4	TRT	
P. virginiana L.	U		3,9	TRT	
Rosa acicularis Lindl.	U		4,5,8	WPP	
R. acicularis X blanda	R		5	TRT	
R. blanda Ait.	U		4,5	WPP	
Rubus allegheniensis Porter	U		4,8	DFB	
R. flagellaris L.	R		3	TRT	
R. pubescens Raf.	C		6,9,11	TRT	
R. strigosus Michx.	C		1,4,5,8	WPP	
*Sorbaria sorbifolia (L.)A. Br.	R		1	RB	
Spiraea alba Du Roi var. latifolia (Ait.)Dipp.	C		8,14	WPP	
Waldsteinia fragariodes (Michx.)Tratt.	C		4,5	DFB, RB	

Fabaceae

Amphicarpaea bracteata (L.)Fern.	U		9,12,13	DFB	
Desmodium canadense (L.)DC.	R		3	TRT	
D. glutinosum (Muhl.)Wood	R		(3?)	RB	
Lathyrus japonicus Willd.	C		7	TRT	
L. palustris L.	U		7	TRT	
*Lotus corniculatus L.	C		1	TRT	
*Medicago sativa ssp. sativa	R		1	TRT	
*M. lupulina L.	R		1	TRT	
*Melilotus alba Medic	C		1	TRT	
*Trifolium hybridum L.	U		1	TRT	
*T. repens L.	C		1,8	TRT	
Vicia cracca L.	C		1,8,14	TRT	

Geraniaceae

Geranium bicknellii Britt.	C		5,8	DFB	
*G. robertianum L.	U		3	DFB	

Oxalidaceae

*Oxalis fontana Bunge	C		1	DFB, RB	
O. montana Raf.	U		6	TRT	
O. stricta L.	R	(77)	1	TRT	Reg

Rutaceae

Zanthoxylum americanum Mill.	U	(88)	10	DFB	Reg

Polygalaceae

Polygala paucifolia Willd.	C		4,5	TRT	
P. polygama Walt.	U	(78)	7,8	TRT	Loc

Euphorbiaceae

Euphorbia glyptosperma Engelm.	R		1	DFB	
*E. vermiculata Raf.	R		1	DFB	

Anacardiaceae

Rhus typhina L.	C		1,7,8	TRT	
Toxicodendron radicans (L.)Kuntze	R	(88)	3	DFB	Reg
T. rydbergii (Sm. ex Rydb.)Garrett	C		1,3,4,5, ,7,8,	DFB, RB	

Aquilfoliaceae

Ilex verticillata (L.)Gray	C		9,13	DFB, RB	

Celastraceae

Celastrus scandens L.	U		8	DFB	

Aceraceae

*Acer negundo L.	U		1,9	TRT	
A. pensylvanicum L.	U		3,6	TRT	
A. rubrum L.	C		3,4	TRT	
A. saccharinum L.	C		9,12	DFB, RB	
A. saccharum Marsh.	C		3,4	DFB, RB	
A. spicatum L.	U		6,10	TRT	

Balsaminaceae

Impatiens capensis Meerb.	C		13,14	DFB	

Rhamnaceae

Ceanothus americanus L.	U	(78)	8	TRT	Loc
C. herbaceus Raf.	U	(78)	5,8	TRT	Loc

Rhamnus alnifolia L'Her.	C		6,9,14,17	TRT	
Vitaceae					
Parthenocissus inserta (A. Kerner)K. Fritsch	C		9,13	DFB, RB	
Vitis riparia Michx.	C		7,9	DFB, RB	
Tiliaceae					
Tilia americana L.	C		3	DFB, RB	
Malvaceae					
*Malva neglecta Wallr.	R		1	DFB	
*M. verticillata L.	R		1	TRT	
Clusiaceae					
Hypericum kalmianum L.	U		7,8	TRT	
*H. perforatum L.	C		1,7,8	TRT	
Triadenum fraseri (Spach)Gl.	U		1,4,16	DFB	
Cistaceae					
Helianthemum canadense (L.)Michx.	U	(78)	5,7,8	TRT	Loc
Violaceae					
Viola adunca Sm.	U	(78)	4	TRT	Loc
V. affinis LeConte	U		3,4	TRT	
*V. arvensis Murr.	R		1	TRT	
V. conspersa Reich.	U		1,3,4	DFB	
V. cucullata Ait.	C		9,13	DFB	
V. mackloskeyi Lloyd ssp. ssp. pallens (Banks)Baker	R		10	TRT	
V. nephrophylla Greene	U		14,17	DFB	
V. pubescens Ait.	R		3	DFB	
V. renifolia Gray	R		6	DFB, RB	
*V. tricolor L.	R		1	TRT	
Eleagnaceae					
Shepherdia canadensis (L.)Nutt.	C		5,8	TRT	

Lythraceae					
*Lythrum salicaria L.	C		1,14,16	TRT	
Onagraceae					
Circaea alpina L.	U		11	DFB, RB	
C. lutetiana L. var. canadensis L.	C		3,4,9	DFB, RB	
Epilobium angustifolium L.	C		3,4,5,8	TRT	
E. ciliatum Raf. ssp. glandulosum (Lehm.)Hoch & Raven	U		8,14	DFB	
E. leptophyllum Raf.	U		9,14	TRT	
E. parviflorum Schreb.	R		(14?)	RB	
Ludwigia palustris (L.)Ell.	U		16	TRT	
Oenothera oakesiana (Gray) Wats. & Coult.	U	(80)	7	TRT	Loc
O. parviflora L.	C		1,7	TRT	
Haloragidaceae					
Proserpinaca palustris L.	R	(88)	14	TRT	
Hippuridaceae					
Hippurus vulgaris L.	R	(80)	16	TRT	
Araliaceae					
Aralia nudicaulis L.	C		3,4,5	WPP	
A. racemosa L.	U		6	TRT	
Apiaceae					
*Aegopodium podagraria L.	R		1	TRT	
Cicuta bulbifera L.	U		14,17	DFB, RB	
*Daucus carota L.	C		1,8	TRT	
Osmorhiza longistylis (Torr.)DC.	R		3	TRT	
Sanicula marilandica L.	U		3,4,10	TRT	
Sium suave Walt.	U		16	DFB	
*Taenidia integerrima (L.)Drude	R		(1?)	DFB, RB	
Cornaceae					
Cornus alternifolia L.f.	R		9	DFB, RB	

C. amomum Mill.	R		13	TRT	
C. canadensis L.	U		6,11	TRT	
C. rugosa Lam.	C		4,5	DFB	
C. stolonifera Michx.	C		3,4,9, 13,14	TRT	
Pyrolaceae					
Chimaphila maculata (L.)Pursh	R	(62)	4	TRT	Nat
C. umbellata (L.)Bartr.	C		4,5	TRT	
Moneses uniflora (L.)Gray	U		6,11	TRT	
Monotropa hypopithys L.	U		4,5	TRT	
M. uniflora L.	C		3,4,5	TRT	
Orthilia secunda (L.)House	U		3,4	TRT	
Pyrola americana Sw.	U		4	TRT	
P. asarifolia Michx.	U		4,11	TRT	
P. chlorantha Sw.	C		5	DFB	
P. elliptica Nutt.	C		4	TRT	
Ericaceae					
Andromeda glaucophylla Link	R		17	DFB	
Arctostaphylos uva-ursi (L.)Spreng.	C		1,4,5,7	WPP	
Epigaea repens L.	C		3,4	WPP	
Gaultheria hispidula (L.)Bigel.	R		9,11	WPP	
G. procumbens L.	C		4,5,8	WPP	
Gaylussacia baccata (Wang.)K.Koch	C		5	WPP	
Vaccinium angustifolium Ait.	C		4,5,8	WPP	
V. myrtilloides Michx.	C		4,5,8	DFB, RB	
V. oxycoccus L.	R		17	TRT	
Primulaceae					
Lysimachia ciliata L.	U		9,13	TRT	
L. terrestris (L.)BSP.	U		14,16	DFB	
L. thyrsiflora L.	U		14,17	TRT	
Trientalis borealis Raf.	C		3,4,6	TRT	
Oleaceae					
Fraxinus americana L.	C		3,4	DFB, RB	
F. nigra Marsh.	C		9,13	TRT	

F. pennsylvanica Marsh.	C		9	WPP	

Gentianaceae

*Centaurium erythraea Raf.	R		1	TRT	
Gentiana andrewsii Griseb.	U		8,14	TRT	
Halenia deflexa (Sm.)Griseb.	U	(81)	6	TRT	Reg

Menyanthaceae

Menyanthes trifoliata L.	U		14,17	DFB, RB	

Apocynaceae

Apocynum androsaemifolium L.	C		1,7,8	TRT	
A. cannabinum L. var. glaberrimum DC.	U		7	DFB	
*Vinca minor L.	R		1	DFB	

Asclepiadaceae

Asclepias incarnata L.	C		9,16	TRT	
A. syriaca L.	C		1,8	TRT	
A. tuberosa L.	C	(82)	1,7,8	TRT	Reg

Convolvulaceae

Calystegia sepium (L.)R.Br.	R		14	DFB	
C. spithamea (L.)Pursh	U		7,8	TRT	
Cuscuta gronovii Willd.	R	(88)	12	TRT	Loc

Boraginaceae

*Cynoglossum officinale L.	R		1	TRT	
*Echium vulgare L.	C		1,8	TRT	
Lithospermum caroliniense (Walt.)Macm.	C		1,5,7,8	TRT	
*L. officinale L.	U		1	DFB	
*Myosotis arvensis (L.)Hill	R		1	DFB	
M. scorpioides (L.)Hill	R		9	TRT	

Verbenaceae

Verbena hastata L.	C		14	DFB	

Lamiaceae

*Glechoma hederacea L.	U		1	TRT	
Lycopus americanus Muhl.	U		9,16	DFB, RB	
L. uniflorus Michx.	C		9,12,13,16	TRT	
Mentha arvensis L.	C		13,14,16	WPP	
Monarda fistulosa L.	C	(89)	5,8	TRT	Loc
*Nepeta cataria L.	R		1	TRT	
*Prunella vulgaris L.	U		1,8	DFB, RB	
*Salvia pratensis L.	R		1	TRT	
*Satureja vulgaris (L.) Fritsch	C		1,8	WPP	
Scutellaria galericulata L.	U		14	TRT	
S. lateriflorus L.	C		14	TRT	
Stachys palustris L.	R		(8?)	RB	

Solonaceae

Physalis heterophylla Nees	R		7,8	TRT	
*Solanum dulcamara L.	C		1,4,8	DFB, RB	

Scrophulariaceae

Agalinis paupercula (Gray)Britt.	R		14	TRT	
A. tenuifolia (Vahl.)Raf. var. parviflora (Nutt.)Penn.	U	(83)	1	TRT	Reg
Chelone glabra L.	U		13,9	DFB	
*Linaria vulgaris Mill.	C		1,8	TRT	
Melampyrum lineare Desr.	C		3,4,5	TRT	
Mimulus ringens L.	R		14	DFB	
Pedicularis canadensis L.	U		4,5	WPP	
*Verbascum thapsus L.	C		1	TRT	
Veronica americana (Raf.)Schwein.	R		11	TRT	
*V. arvensis L.	R		1	DFB	
*V. serpyllifolia L.	R		1	DFB	

Lentibulariaceae

Utricularia gibba L.	R		14	TRT	
U. intermedia Hayne	U		14,17	TRT	
U. minor L.	U	(89)	14,17	TRT	Loc
U. vulgaris L.	U		15	DFB	

Phrymaceae

Phryma leptostachya L.	R	3	TRT

Plantaginaceae

*Plantago lanceolata L.	C	1	TRT
*P. major L.	C	1,4,8	DFB, RB

Rubiaceae

Cephalanthus occidentalis L.	U		13	DFB, RB	
Galium labradoricum (Wieg.)Wieg.	U	(89)	14,17	TRT	Loc
G. lanceolatum Torr.	R		3	TRT	
G. palustre L.	U		13,14	TRT	
G. triflorum Michx.	C		3,4	TRT	
Houstonia longifolia Gaertn.	C		4,7,8	TRT	
Mitchella repens L.	C		3,4	TRT	

Caprifoliaceae

Diervilla lonicera Mill.	C	4,5,8	TRT
Linnaea borealis L.	C	4,5,6	TRT
Lonicera canadensis Marsh.	C	3,4	TRT
L. dioica L.	C	4,5	TRT
L. hirsuta Eat.	U	3,5	DFB
L. oblongifolia (Goldie)Hook.	R	11,14	TRT
Sambucus canadensis L.	R	14	DFB
S. pubens Michx.	R	4	TRT
Symphoricarpos albus (L.)Blake	C	4,5,8	WPP
Viburnum acerifolium L.	U	3,4	WPP
V. lentago L.	U	9,13	DFB, RB
V. opulus L.			
* var. opulus	U	1	TRT
var. americanum Ait.	U	9,13	DFB

Campanulaceae

Campanula rapunculoides L.	R	1	DFB
*C. uliginosa Rydb.	U	14,16,17	DFB, RB

Lobeliaceae

Lobelia cardinalis L.	U	12	TRT

L. kalmii L.	U		14,17	TRT	

Asteraceae

*Achillea millefolium L.	C		1	TRT	
*Ambrosia artemisiifolia L.	C		1	DFB	
*Anaphalis margaritacea (L.)Benth.	U		1	DFB	
Antennaria neodioica Greene ssp. neodioica	U		1,8	DFB	
A. parlinii Fern. ssp. fallax (Greene)Bayer & Stebbins	R		5	TRT	
*Arctium minus (Hill)Berhn.	C		1	WPP	
*Artemisia biennis Willd.	U		1	TRT	
A. campestris L.	C		7	WPP	
Aster borealis (T.&G.)Prov.	U		14,17	WAT	
A. ciliolatus Lindl.	R		1	TRT	
A. cordifolius L.	C		1,3,4,5,8	TRT	
A. laevis L.	C		1,7,8	TRT	
A. lanceolatus Willd. var. lanceolatus	C		3,4	TRT	
A. lateriflorus (L.)Britt. var. lateriflorus	C		9,14	TRT	
A. macrophyllus L.	C		3,4,5	TRT	
A. puniceus L.	U		9,13	WPP	
A. urophyllus Lindl.	U		1,3	TRT	
Bidens cernua L.	C		14,16	TRT	
B. frondosa L.	C		11,13	DFB	
*Centaurea maculosa Lam.	C		1	TRT	
*Chrysanthemum leucanthemum L.	C		1,8	TRT	
*Cichorium intybus L.	R		1	TRT	
Cirsium arvense (L.)Scop.	C		1	TRT	
C. hilli (Canby)Fern.	R	(65)	5,8	TRT	Nat
*C. vulgare (Savi)Tenore	U		1	DFB	
*Conyza canadensis (L.)Cronq.	C		1	DFB, RB	
*Crepis tectorum L.	U		1	TRT	
Erigeron annus (L.)Pers.					
* ssp. annuus	U		1,7	TRT	
* ssp. strigosus (Muhl.)Wag.	R		1	TRT	
E. philadelphicus L.	U		1	DFB	

Eupatorium maculatum L.	U		13,14	TRT	
E. perfoliatum L.	C		14,17	TRT	
E. rugosum Houtt.	U		9,12	TRT	
Euthamia graminifolia (L.)Nutt.	C		14,16	TRT	
*Gnaphalium uliginosum L.	R		3	DFB	
*Helianthus annuus L.	R		1	DFB	
*Hieracium aurantiacum L.	C		1,7,8	TRT	
*H. caespitosum Dum.	C		1,7,8	TRT	
H. canadense Michx. var. canadense	U		5,7	TRT	
H. gronovii L.	R	(83)	5,8	TRT	Reg
*H. pilosella L.	C		1,7,8	TRT	
*H. piloselloides Vill.	C		1,7,8	TRT	
H. scabrum Michx.	R		8	WPP	
Lactuca hirsuta Muhl.	U		8	TRT	
*Leontodon taraxacoides (Vill.)Merat	R		1	TRT	
*Matricaria matricarioides (Less.)Port.	C		1	DFB	
Petasites palmatus (Ait.)Gray	U		6,10,11	DFB	
Prenanthes alba L.	U		4,6	DFB	
P. altissima L.	C		3,4	TRT	
*Rudbeckia hirta L.	C		1,8	TRT	
Senecio aureus L.	U		14,17	TRT	
S. pauperculus Michx.	C		8	TRT	
*S. vulgaris L.	R		1	DFB	
Solidago altissima L.	R		8	DFB	
S. canadensis L. ssp. canadensis	C		1,8	TRT	
S. gigantea Ait.	R		13	DFB	
S. hispida Muhl.	U		5,8	TRT	
S. juncea Ait.	U		4,5	DFB	
S. nemoralis Ait. ssp. nemoralis	C		1,5,7,8	TRT	
S. ohioensis Riddell	U	(89)	14	WAT	Loc
S. rugosa Ait. ssp. rugosa	C		8	DFB	
S. uliginosa Nutt.	U		14,17	DFB, RB	
*Sonchus asper (L.)Hill	U		1	TRT	
*Taraxacum erythrospermum Bess.	R		1	TRT	
*T. officinale Weber	C		1,3,4	TRT	
*Tragopogon dubius Scop.	C		1	TRT	
*T. pratensis L.	U		1	TRT	

*Tussilago farfara L.	U	1	DFB
Virgulus novae-angliae (L.)Rev. & Keen.	U	1,8	DFB
Xanthium strumarium L.	C	7	DFB

ACRONYMS FOR HERBARIA OR OBSERVERS

CAN - National Museum of Natural Sciences, Ottawa
DFB - Daniel F. Brunton observations (this study)
OAC - University of Guelph, Guelph
RB - R.S.W. Bobbette (Bobbette 1975) observations
TRT - Royal Ontario Museum, Toronto
WAT - Waterloo University, Waterloo
WO - University of Western Ontario, London

APPENDIX 2 : VASCULAR PLANT COLLECTIONS

The following lists all of the vascular plant specimens collected during this study. The number preceding each species name is the D.F. Brunton collection number.

Vouchers have been deposited primarily in the Royal Ontario Museum herbarium (TRT). Selected material is duplicated at DAO, WAT, CAN and DFB (acronyms as with Boivin 1980). All fern specimens were verified by specimens sent to D.M. Britton at the University of Guelph (OAC) and a number of others were sent to A.A. Reznicek at the University of Michigan (MICH) for examination.

28 June 1988

- 2 km south of Highway 92 along Powerline Road.

8018 - Carex pensylvanica
8019 - Houstonia longifolia
8020 - Lithospermum caroliniense
8021 - Hypericum perforatum
8023 - Maianthemum canadense var. interior
8024 - Hieracium piloselloides
8025 - Polygala pauciflora

-100m west of Linda Lane in Oakview Woods.

8031 - Carex eburnea
8032 - Carex arctata

6 July 1988

- Park Office, Beach 3.

8808 - Festuca rubra

- N side Powerline Road 1 km NE of Klondike Road at 784288 (41 A/8).

8082 - Carex granularis
8083 - Shepherdia canadensis
8084 - Senecio pauperculus
8085 - Dichanthelium acuminatum var. implicatum
8087 - Sisyrinchium montanum
8088 - Juncus brevicaudatus

- 200m along woodland trail east of Golf Course Road by Marl Lake

8089 - Monotropa hypopithys

7 July 1988

- ½ km southeast of Westbury Street by ski trail.

8092 - Monotropa hypopithys
8097 - Sparganium minimum
8098 - Alopecurus aequalis
8099 - Glyceria borealis
8100 - Carex cristatella

- along ski trail in north end of park at 785294 (41 A/9).

8101 - Dichanthelium xanthophysum
8102 - Carex blanda

- 1.5 km S of north end of park by ski shelter.

8103A- Dichanthelium depauperatum
8103B- Antennaria parlinii ssp. fallax
8103C- Hieracium pilosella
8104 - Bromus kalmii
8105 - Dichanthelium sabulorum
8106 - Oryzopsis pungens
8107 - Poa angustifolia
8108A- Festuca trachyphylla
8108B- Polygala polygama
8109 - Festuca saximontana
8110 - Carex lucorum
8111 - Ceanothus herbaceus
8112A- Anemone multifida
8112B- Anemone virginiana
8113 - Arabis lyrata

- east side of Ross's Woods.

8115 - Sedum hispanicum
8116 - Sedum telephium
8117 - Juncus compressus

- by park office, Beach 3.

8120 - Viola tricolor

- at 16th Street beach

8121 - Prunus pumila ssp. pumila

- Beach 2 picnic area.

8124 - Salvia pratensis

8 July 1988

- Nottawasaga River opposite Lamont Creek.

8125 - Potamogeton friesii
8126 - Geum laciniatum
8129 - Myosotis scorpiodes
8130 - Parnassia glauca
8131 - Carex tenera

- Nottawasaga Boat launch.

8134 - Dichanthelium latifolium

- ½ km south of filtration plant along track to boat launch.

8135 - Elymus canadensis
8136 - Rosa acicularis X blanda
8137 - Viola adunca
8138 - Cyperus houghtonii
8139 - Crepis tectorum

9 July 1988

- north end of Marl Lake .

8140 - Eleocharis rostellata
8141 - Galium palustre
8142B- Galium labradoricum
8143 - Carex interior
8144 - Proserpinaca palustris
8145 - Salix candida
8146 - Salix serissima
8147 - Juncus brachycephalus
8148 - Trillium cernuum
8149 - Scirpus pendulus
8150 - Juncus compressus

- south end of Marl Lake.

8151 - Geum laciniatum
8152 - Eriophorum viridi-carinatum
8153 - Carex buxbaumii
8154 - Thalictrum pubescens
8155 - Selaginella eclipes
8156 - Dichanthelium acuminatum var. lindheimeri
8158 - Dichanthelium acuminatum var. implicatum

10 July 1988

- Beach 1.

8159 - Lathyrus japonicus
8160 - Cakile edentula
8161 - Alyssum alyssoides

8162 - Salix exigua
8163 - Salix cordata
8164 - Scirpus americanus

25 July 1988

- northwest area of the park at 791288 (41 A/9) by the ski trail.

8203 - Carex castanea
8204A- Lycopodium obscurum var. obscurum
8204B- Pyrola americana
8205 - Platanthera hookeri

- by red ski trail at 784284 (41 A/9).

8208 - Cyperus filiculmis
8209 - Lycopodium Xhabereri
8211 - Agropyron trachycalum var. unilaterale
8212 - Anemone multifida
8214 - Oenothera oakesiana
8215 - Asclepias tuberosa

- 60th Street Beach .

8216 - Equisetum variegatum

- 42nd Street by Oakview Woods (south)

8217 - Centaurium erythraea
8218 - Selaginella eclipes

- Oakview Woods (south of Mosley Street).

8219 - Lysimachia ciliata
8220 - Carex buxbaumii

- by park office, Beach 3.

8221 - Potamogeton pectinata
8222 - Camelina microcarpa

29 August 1988

- New Wasaga Beach.

8442 - Calamagrostis stricta ssp. inexpansa
8443 - Agrostis stolonifera
8444 - Hypericum kalmianum
8445 - Physocarpus opulifolius

8446 - Pyrola asarifolia
8447 - Prunus pumila ssp. pumila
8448 - Hieracium canadense var. canadense

- Oakview Woods (north of Mosley Street)

8449 - Parnassia glauca
8450 - Andropogon scoparius
8451 - Leontodon taraxacoides
8452 - Muhlenbergia schreberi
8453 - Viburnum opulus var. opulus
8455 - Goodyera tesselata
8456 - Goodyera oblongifolia
8457 - Halenia deflexa
8458 - Goodyera oblongifolia x tesselata

30 August 1988

- Nottawasaga River ½ km northwest of Klondike Road.

8464 - Carex granularis
8465 - Gentiana andrewsii

- Nottawasaga River 1km east of Klondike Road

8466 - Crataegus punctata
8467 - Crataegus flabellata

- outlet of Jacks Lake, north side

8468 - Amaranthus tuberculatus
8469 - Pilea pumila
8470A- Polygonum hydropiperoides
8470B- Carex lupulina
8471 - Carex retrorsa
8472 - Menispermum canadense
8473 - Carex tuckermanii
8474 - Elymus virginicus
8475 - Osmorhiza longistylis
8476 - Rumex obtusifolius
8477 - Ulmus americanus
8478 - Hepatica acutiloba
8479 - Phryma leptostachya
8480 - Carex radiata
8481 - Carex platyphylla
8482 - Carex blanda

- north arm of Jacks Lake

8483 - Ludwigia palustris
8484 - Cornus amomum

- Nottawasaga River at southeast corner of Jacks Lake.

8487 - Dulichium arundinaceum
8488 - Cuscuta gronovii

- east shore of Nottawasaga River at Jacks Lake outlet.

8490 - Polygonum hydropiperoides
8491 - Cyperus esculentus
8492 - Rorripa palustris ssp. fernaldii

- Nottawasaga River at Klondike Road

8493 - Lobelia cardinalis

31 August 1988

- south side of Powerline Road 1.5 km northwest of Klondike Road.

8501 - Cinna latifolia
8502 - Moneses uniflora
8505 - Listera convallarioides

- 2 km west of Klondike Road on northwest side of Powerline Road.

8506 - Hieracium caespitosum
8507 - Dichanthelium sabulorum
8508 - Helianthemum canadense

- north side of Powerline Road ½ km west og Klondike Road.

8509 - Equisetum hyemale

- ½ km south of trailer park along road.

8510 - Sporobolus vaginiflorus var. inaequalis
8511 - Sporobolus neglectus
8512 - Agalinus tenuifolia var. parviflora

- ½ km north of Jacks Lake and east of the trailer park.

8513 - Lonicera oblongifolia
8515 - Rumex orbiculatus
8516 - Equisetum arvense
8517 - Ranunculus recurvatus
8518 - Thalictrum pubescens
8519 - Smilacina trifolia
8520 - Calopogon tuberosa
8521 - Carex gynocrates
8522 - Liparis loeselii
8523 - Eleocharis elliptica

8524 - Lobelia kalmii
8525 - Galium labradoricum
8527 - Scirpus hudsonianus
8528 - Rhynchospora alba
8529 - Carex limosa
8530 - Spiranthes romanzoffiana
8531 - Triglochin maritima
8532 - Aster borealis
8533 - Muhlenbergia glomerata
8534 - Vaccinium oxycoccus

- Nottawasaga River at Powerline Road (north).

8536 - Cyperus filiculmis

1 September 1988

- Nottawasaga River at Powerline Road (north).

8537 - Cyperus rivularis
8538 - Hippurus vulgaris

- north end of Marl Lake.

8539 - Potamogeton illinoensis
8540 - Epilobium leptophyllum
8541 - Triglochin palustre
8542 - Agalinus paupercula

- south end of Marl Lake.

8543 - Eleocharis rostellata
8544 - Utricularia gibba
8546 - Thalictrum pubescens
8547 - Solidago ohioensis

- north of Marl Lake.

8548 - Bromus ciliatus
8549 - Aster urophyllus
8550 - Aster laevis

2 September 1988

by the old race track near The Oxbow.

8551 - Viola arvensis

- at the boat launch, Nottawasaga River.

8552 - Cyperus houghtonii
8553 - Physalis heterophylla
8554 - Muhlenbergia mexicana var. filiformis
8555 - Elymus virginicus

8556 - Eragrostis frankii
8557 - Agropyron trachycaulum var. novae-angliae

- 1 km south of the filtration plant, The Oxbow.

8558 - Festuca saximontana

3 September 1988

- by red ski trail shelter at 784284 (41 A/9).

8560 - Hieracium gronovii
8561 - Cirsium hillii

- west side of Powerline Road ½ km south of River Road.

8562 - Gaultheria hispidulum
8563 - Agalinis tenuifolia var. parviflora

- park office, Beach 3.

8567 - Oxalis stricta

10 October 1988 with K.L. McIntosh

- by park office, Beach 3.

8721 - Malva verticillata

.... with K.L. McIntosh, J.L. Riley and K. Lindsay

- east of trailer park and S of Golf Course Road.

8723 - Selaginella eclipes
8725 - Juncus brachycephalus

APPENDIX 3 : CHECKLIST OF BIRDS

The following lists the approximately 230 species of birds that have been recorded from the Wasaga Beach Provincial Park study are as determined from Anonymous (1980), Devitt (1967)and the observations of this study. Breeding bird atlas data (Cadman *et al*. 1987) were used only to confirm, if possible, breeding in the park area. These data were used only when previous documentation did not indicate breeding evidence, as they are not necessarily from within park boundaries. Significant species are underlined and the page number for their status discussion is indicated in brackets following the name listing.

Nomenclature follows Godfrey (1986), although the earlier order is used to facilitate comparision with the references cited previously. If the breeding evidence pre-dates the study preiod of the Ontario breeding bird atlas project (before 1981), the species name is also marked #.

Common Loon*#
Red-throated Loon
Red-necked Grebe
Horned Grebe
Pied-billed Grebe*
American Bittern*
Least Bittern* (88)
Great Blue Heron
Green-backed Heron*
Double-crested Cormorant
Whistling Swan
Canada Goose*
Brant
Snow Goose
Mallard*
Black Duck*
Pintail *
Blue-winged Teal*
Green-winged Teal
American Wigeon
Wood Duck*
Redhead
Ring-necked Duck
Canvasback
Greater Scaup
Lesser Scaup
Common Golden-eye
Bufflehead
Oldsquaw
White-winged Scoter
Surf Scoter
Black Scoter
Ruddy Duck
Hooded Merganser*
Common Merganser
Red-breasted Merganser
Turkey Vulture
Goshawk
Sharp-shinned Hawk
Cooper's Hawk
Red-tailed Hawk
Red-shouldered Hawk
Broad-winged Hawk*
Rough-legged Hawk
Bald Eagle
Northern Harrier*
Osprey*#
Peregrine Falcon
Merlin
American Kestrel*
Ruffed Grouse*
Ring-necked Pheasant
Sandhill Crane
Virginia Rail*
Sora*
Yellow Rail (?)(88)
Moorhen*
American Coot*
Semipalmated Plover
Piping Plover *# (88)
Killdeer*
Lesser Golden Plover
Black-bellied Plover
Ruddy Turnstone
American Woodcock*
Common Snipe*
Whimbrel
Upland Sandpiper*
Spotted Sandpiper*
Solitary Sandpiper
Greater Yellowlegs
Lesser Yellowlegs
Red Knot
Pectoral Sandpiper

White-rumped Sandpiper
Baird's Sandpiper
Least Sandpiper
Dunlin
Semipalmated Sandpiper
Western Sandpiper
Sanderling
Short-billed Dowitcher
Buff-breasted Sandpiper
Ruff
Red Phalarope
Wilson's Phalarope
Red-necked Phalarope
Pomarine Jaeger
Glaucous Gull
Great Black-backed Gull
Herring Gull
Ring-billed Gull
Franklin's Gull
Bonaparte's Gull
Forster's Tern
Common Tern
Caspian Tern (89)
Black Tern * (89)
Rock Dove*
Mourning Dove*
(Passenger Pigeon - extinct)
Yellow-billed Cuckoo * (90)
Black-billed Cuckoo*
Screech Owl *
Great Horned Owl
Snowy Owl
Short-eared Owl
Boreal Owl
Saw-whet Owl*#
Whip-poor-will*
Common Nighthawk*
Chimney Swift*
Ruby-throated Hummingbird*
Belted Kingfisher*
Northern Flicker*
Pileated Woodpecker*
Red-headed Woodpecker*
Yellow-bellied Sapsucker*
Hairy Woodpecker*
Downy Woodpecker*
Black-backed Woodpecker
Three-toed Woodpecker
Eastern Kingbird*
Great-crested Flycatcher*
Eastern Phoebe*
Yellow-bellied Flycatcher
Alder Flycatcher*
Least Flycatcher*
Willow Flycatcher
Eastern Wood Pewee*

Olive-sided Flycatcher*#
Horned Lark*
Tree Swallow*
Bank Swallow*
Rough-winged Swallow*
Barn Swallow*
Cliff Swallow*
Purple Martin*
Gray Jay
Blue Jay*
Common Crow*
Common Raven
Black-capped Chickadee*
White-breasted Nuthatch*
Red-breasted Nuthatch*
Brown Creeper*
House Wren*
Winter Wren*#
Marsh Wren*
Sedge Wren*# (90)
Northern Mockingbird
Gray Catbird*
Brown Thrasher*
American Robin*
Wood Thrush*
Hermit Thrush*#
Swainson's Thrush
Veery*
Eastern Bluebird*#
Blue-gray Gnatcatcher
Golden-crowned Kinglet *# (90)
Ruby-crowned Kinglet
Water Pipit
Cedar Waxwing*
Northern Shrike
Loggerhead Shrike*# (89)
Starling*
Yellow-throated Vireo
Solitary Vireo
Red-eyed Vireo*
Warbling Vireo*
Philadelphia Vireo
Black and White Warbler*
Golden-winged Warbler
Blue-winged Warbler
Orange-crowned Warbler
Nashville Warbler*#
Northern Parula Warbler
Yellow Warbler*
Magnolia Warbler
Cape May Warbler
Black-throated Blue Warbler
Yellow-rumped Warbler*#
Black-throated Green Warbler*#
Blackburnian Warbler
Chesnut-sided Warbler*

Bay-breasted Warbler
Pine Warbler*
Prairie Warbler*# (89)
Palm Warbler
Ovenbird*
Northern Waterthrush*
Mourning Warbler*
Common Yellowthroat*
Wilson's Warbler
Canada Warbler
American Redstart*
House Sparrow*
Bobolink*
Eastern Meadowlark*
Red-winged Blackbird*
Northern Oriole*
Rusty Blackbird
Common Grackle*
Brown-headed Cowbird*
Scarlet Tanager*
Cardinal*
Rose-breasted Grosbeak*
Indigo Bunting*
Purple Finch*
Evening Grosbeak
Pine Grosbeak
Common Redpoll
Pine Siskin*#
American Goldfinch
Red Crossbill
White-winged Crossbill
Rufous-sided Towhee*
Savannah Sparrow*
Grasshopper Sparrow* (91)
Vesper Sparrow*
Dark-eyed Junco
Tree Sparrow
Chipping Sparrow*
Clay-colored Sparrow*
Field Sparrow*
White-crowned Sparrow
White-throated Sparrow*
Lincoln's Sparrow
Swamp Sparrow*
Song Sparrow*
Lapland Longspur
Snow Bunting

APPENDIX 4 : CHECKLIST OF MAMMALS

The following lists the 44 species of mammals which are known to include the Wasaga Beach Provincial Park area within their range (Peterson 1966). A number were observed during this study and are indicated by their names being underlined. The remainder are possible species, though a number likely are not found here because of habitat limitations, low populations or other factors.

None of the mammals known from Wasaga Beach Provincial Park are known to be regionally or provincially significant.

Masked Shrew

Masked Shrew
Smokey Shrew
Water Shrew
Pygmy Shrew
Big Short-tailed Shrew
Brewer's Mole
Star-nosed Mole
Little Brown Bat
Keen's Bat
Silver-haired Bat
Big Brown Bat
Red Bat
Hoary Bat
Snowshoe Hare
Cotton-tail Rabbit
European Hare
Gray Squirrel
Red Squirrel
Woodchuck
Eastern Chipmunk
Eastern Flying Squirrel
Northern Flying Squirrel
Beaver
Deer Mouse
White-footed Mouse
Southern Bog Lemming
Red-backed Vole
Meadow Vole
Muskrat
Norway Rat
House Mouse
Meadow Jumping Mouse
Woodland Jumping Mouse
Porcupine
Coyote
Red Fox
Raccoon
Ermine
Long-tailed Weasel
Mink
Striped Skunk
Otter
Bobcat
White-tailed Deer

APPENDIX 5 : CHECKLIST OF AMPHIBIANS AND REPTILES

The following lists the 32 species of reptiles and amphibians that are known from the general area of Wasaga Beach Provincial Park. Few were actually observed during this study (those noted are *underlined* on the following list). Accordingly, the list is drawn from those species which are within range and for which suitable habitat appears to exist in the Wasaga Beach study area (cf. Cooke 1984; Plourde *et al*. 1988).

Nomenclature and order follows Cook (1984).

Mudpuppy
Eastern Newt
Blue-spotted Salamander
Yellow-spotted Salamander
Eastern Red-backed Salamander
American Toad
Spring Peeper
Tetraploid Gray Treefrog
Striped Chorus Frof
Wood Frog
Leopard Frog
Pickerel Frog
Green Frog
Mink Frog
Bullfrog
Snapping Turtle
Stinkpot
Painted Turtle
Map Turtle
Blanding's Turtle
Five-lined Skink
Common Garter Snake
Eastern Ribbon Snake
Northern Water Snake
Redbelly Snake
Smooth Green Snake
Ringneck Snake
Eastern Hognose Snake
Fox Snake
Milk Snake
(Massasauga - formerly)

Herpetological observations made during 1988 were deposited in the Ontario Herptofaunal Survey data files.

APPENDIX 6 :

AREA OF NATURAL AND SCIENTIFIC INTEREST – LIFE SCIENCE INVENTORY CHECK-SHEET

NAME: WASAGA BEACH PARK NATURE RESERVE

MAP NAME: Nottawasaga Collingwood

MAP NUMBER: 41 A/8; A/9

UTM REF.: 760280

COUNTY, DISTRICT or REGIONAL MUNICIPALITY: SIMCOE

LAT.: 44 ° 30 ' N

LONG.: 80 ° 01 ' W

ALT. MIN.: 182m MAX.: 227m

LOCALITY: Town of Wasaga Beach

TOWNSHIP / LOTS / CONCESSIONS: Wasaga Beach (formerly Flos, Sunnidale and Nottawasaga Townships)

AREA: acres ca. 1500 ha

OWNERSHIP: OMNR and (minority) private

ADMINISTRATION: OMNR - Parks

FOREST REGION AND DISTRICT:

SITE REGION AND DISTRICT: Barrie (6-6)

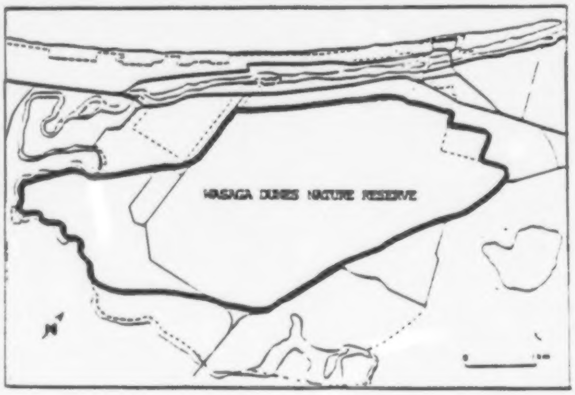
MNR REGION AND DISTRICT: Huronia

CONSERVATION AUTHORITY: Nottawasaga

AERIAL PHOTOGRAPHS — BASE MAP:

YEAR	ROLL	FLIGHT LINE	NUMBERS
1978	101	4436	90-95
1978	95	4435	159-165
1978	95	4434	206-211
1978	95	4433	250-252

1:50,000 NTS MAP SHOWING AREA BOUNDARIES 1:250,000



PHYSICAL AND BIOLOGICAL FEATURES

Wasaga Beach Provinical Park includes a complex of dune and barrier bar features which are provincially significant. The nature reserve area encompasses a large area of relatively natural transverse and parabolic dunes, as well as an extensive area of raised beaches which are relict from postglacial Lake Nipissing (see page 155).

Extensive dry site vegetation dominates the dune areas. Mixed and deciduous forests of Red Oak, White Pine, Red Maple and Trembling Aspen, with wetland pockets of Cedar and Cedar-Black Ash, are common in the lower foredunes and the lower slopes of the transverse dunes. Increased dominance by White and Red Pine and Red Oak is evident with increased elevation up the dune complex. Throughout the higher, driest areas of the dunes small prairie-like meadows and open sand areas (blow-outs and sand prairies) are commonly encountered within the forest. Erosion - natural and man-caused - has created open sand slopes and blow-outs

Several types of vegetation are considered to be provincially significant. These include :

(cont'd)

DATA SHEETS ATTACHED

PHYSICAL DESCRIPTION ☐
VEGETATION SUMMARY ☐
EVALUATION SHEET ☐
COMMUNITY DESCRS. ☐
COMMUNITY COMP. LISTS ☐
SUMMARY SPECIES LISTS ☐
PHYSICAL FEATURES MAP ☐
VEGETATION MAP ☐
BIBLIOGRAPHY ☐
PHOTOGRAPHS ☐

MAJOR INFORMATION SOURCES

Brunton, D.F. 1989. Biological Inventory and Evaluation of Wasaga Beach Provincial Park and Adjacent Natural Areas, Simcoe County, Ontario. Parks & Rec. Areas Section, Richmond Hill.

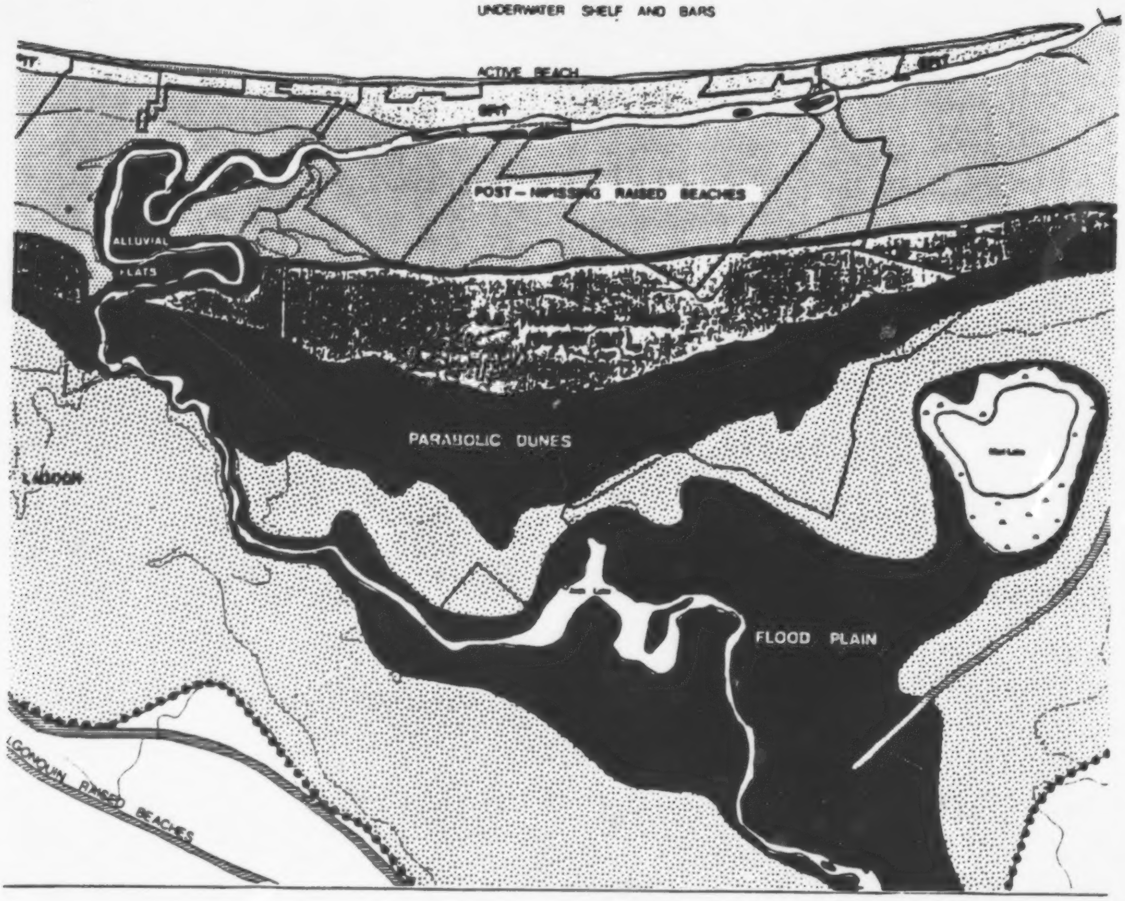
EVALUATION AND PRIORITIES

Provincially significant dune complex with exceptional flora and vegetation.

DATE COMPILED: March 1989

COMPILER: Daniel F. Brunton

Nottawasaga Bay


UNDERWATER SHELF AND BARS
SPIT
ACTIVE BEACH
SPIT
SPIT
POST-NIPISSING RAISED BEACHES
ALLUVIAL FLATS
PARABOLIC DUNES
LAGOON
FLOOD PLAIN
ALGONQUIN RAISED BEACHES

a) *Upland Intolerant Coniferous Forest* This is the extensive Red and White Pine forest on warmer than normal sand sites in the upper dunes. They are very poorly represented elsewhere in Site District 6-6.

b) *Upland Sand Barrens* The open sand barrens support flora that are relict from prehistoric postglacial times, often indicating prairie and / or southern affinities and including several very unusual species. This vegetation is rare in Ontario and is very poorly represented elsewhere in the Site District.

c) *Upland Meadows and Thickets* The natural meadows in the dune-top very dry to arid pineries support rich prairie floral assemblages unmatched elsewhere in the Site District and rare in Ontario.

The flora of the dunes area is very distinctive and supports a number of exceptional elements, including three nationally rare species. They are :

Cyperus houghtonii (Houghton's Cyperus) A rare southern sedge known from less than 20 locations in Canada but regularly encountered in the dunes.

Chimaphila maculata (Spotted Wintergreen) An Endangered Species in Canada, as designated by the COSEWIC process, this shrub is known from only one other recent location in Canada (Norfolk County, Ontario). It is a southern species.

Cirsium hillii (Hill's Thistle) This species is endemic to the Great Lakes region of North America and is known elsewhere in Canada from less than 10 recent records - all consisting of a few plants. It has declined in overall population in recent times and may be globally threatened.

In addition to these nationally/internationally important species, over 20 other taxa are Regionally Significant (within Simcoe County) and another 16 are Locally Significant.

The dunes are a fire dependent ecosystem and appear to have suffered by effective fire suppression over the last 20 to 40 years. The sand prairies and open-canopy forest areas are becoming overgrown and several significant plant species seem to have declined in numbers in recent years as a result. The endangered *Cirsium hillii*, for example, was observed only as sterile rosettes; no flowering plants nor setting of seed was found in 1988.

Recommendations were made to enlarge the existing nature reserve zone to enable protective management for a larger portion of the dunes complex to be more readily effected. Other measures, such as removal of conifer plantations and development of a fire managment plan, are recommended to return the level of natural disturbance to a more typical pattern.

APPENDIX 7 :

AREA OF NATURAL AND SCIENTIFIC INTEREST - LIFE SCIENCE INVENTORY CHECK-SHEET

NAME	MAP NAME	MAP NUMBER	UTM REF.
MARL LAKE ANSI	Barrie	31 D/12	810290

COUNTY, DISTRICT or REGIONAL MUNICIPALITY	LAT.	LONG.	ALT. MIN.	MAX.
Simcoe County	44° 30 'N	79 ° 58 'W	190m	190m

LOCALITY
northeast of Wasaga Beach

TOWNSHIP **LOTS** **CONCESSIONS**
Wasaga Beach town (formerly in Flos Tp.)

AREA
acres ca. 90 ha

OWNERSHIP
crown & private

ADMINISTRATION
OMNR

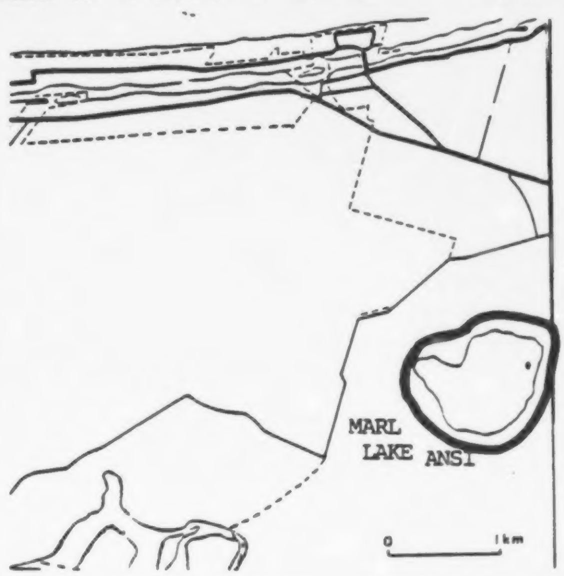
FOREST REGION AND DISTRICT	SITE REGION AND DISTRICT
	Barrie 6-6

MNR REGION AND DISTRICT	CONSERVATION AUTHORITY
Huronia	Nottawasaga

AERIAL PHOTOGRAPHS **BASE MAP:**

YEAR	ROLL	FLIGHT LINE	NUMBERS
1971	4421	16	5
1978	4436	101	95

1:50,000 NTS MAP SHOWING AREA BOUNDARIES 1:250,000



PHYSICAL AND BIOLOGICAL FEATURES

This wetland complex is situated in the lagoon basin formed by postglacial Lake Nipissing, in the depression connecting the Lake Simcoe area with Georgian Bay. A variety of wetland flora and vegetation are supported in the organic marl substrate of the site. The lake is shallow and warm, covered in Chara algae on its bottom, and containing very clear water. Extensive emergent vegetation area have developed on all sides, grading into lowland forests of Cedar, Larch and Alder. The surrounding upland areas are developed, with a large golf course on the west side of the lake being the most dominant.

The fen-like marl-based wet meadow vegetation (Type 14) along the south, west and north shores of the lake are very significant life science resources. They are relict shoreline communities from postglacial Lake Nipissing and support a wide variety of rare and unusual flora. These communities are being destroyed by development in areas to the west of Wasaga Beach and they are also unrepresented in the Site District and Site Region, except for tiny examples in Awenda Provincial Park. The nationally rare Beaked Spike-rush (Eleocharis rostellata) is found in this vegetation at the north and south ends of Marl Lake.

(cont'd)

DATA SHEETS ATTACHED

- PHYSICAL DESCRIPTION ☐
- VEGETATION SUMMARY ☐
- EVALUATION SHEET ☐
- COMMUNITY DESCRS. ☐
- COMMUNITY COMP. LISTS ☐
- SUMMARY SPECIES LISTS ☐
- PHYSICAL FEATURES MAP ☐
- VEGETATION MAP ☐
- BIBLIOGRAPHY ☐
- PHOTOGRAPHS ☐

MAJOR INFORMATION SOURCES

D.F. Brunton. 1989. Biological Inventory and Evaluation of Wasaga Beach Prov. Park and Adjacent Natural Areas, Simcoe County, Ontario. Parks & Rec. Areas Section, Richmond Hill.

EVALUATION AND PRIORITIES

Provincially significant wetland complex and relict shore meadow area.

DATE COMPILED	COMPILER
March 1989	Daniel F. Brunton

Ontario Ministry of Natural Resources, Parks and Recreational Areas Programme, Queen's Park, Toronto, Ontario M7A 1W3

Four regionally significant plant species are found here :

- Dichanthelium boreale
- Carex livida
- Carex pallescens
- Geum laciniatum

and 13 locally significant species are also known from the lake.

Least Bittern and Black Tern, both provincially significant bird species, are known from Marl Lake, both as breeding species. Yellow Rail may occur here, as a possible sighting was made in 1988 in suitable habitat at the south end of Marl Lake. It too is provincially siginificant. The lake area may serve as an important late summer/early fall staging/feeding area for migrating insectivorous birds; hundreds of swallows were observed resting & feeding there in September 1988.

It is recommended that the lake and its adjacent wetland vegetation be managed to preserve the important floral and vegetational resources present there. The natural fluctuations in water level are felt to be particularly important in this regard. It is recommended that the site be established as a provincially significant ANSI.

APPENDIX: 8 :

AREA OF NATURAL AND SCIENTIFIC INTEREST – LIFE SCIENCE INVENTORY CHECK-SHEET

NAME	MAP NAME	MAP NUMBER	UTM REF.
OAKVIEW WOODS NATURE RESERVE ZONE	Collingwood	41 A/8	737254

COUNTY, DISTRICT or REGIONAL MUNICIPALITY	LAT.	LONG.	ALT. MIN.	MAX.
Simcoe County	44 °29 'N	80 ° 04 'W	183m	183m

LOCALITY
Wasaga Beach town

TOWNSHIP LOTS CONCESSIONS
Wasaga Beach (formerly Sunnidale Tp.)

AREA
acres ca. 12 ha

OWNERSHIP
crown

ADMINISTRATION
OMNR

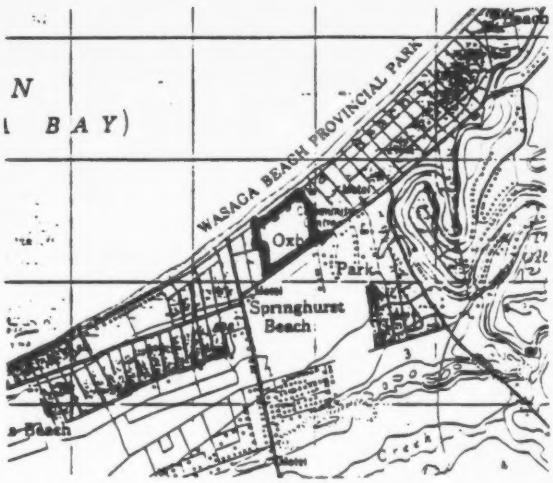
FOREST REGION AND DISTRICT	SITE REGION AND DISTRICT
	Barrie 6-6

MNR REGION AND DISTRICT	CONSERVATION AUTHORITY
Huronia- Central	Nottawasaga

AERIAL PHOTOGRAPHS BASE MAP:

YEAR	ROLL	FLIGHT LINE	NUMBERS
1978	4434	95	205-206

1:50.000 NTS MAP SHOWING AREA BOUNDARIES 1:250.000



PHYSICAL AND BIOLOGICAL FEATURES

The raised beaches of the Georgian Bay shore exhibit an alternating pattern of dry sandy ridges and wet sandy depressions back from the lakeshore. These sites demonstate the forest vegetation variation that reflects that condition, with Hemlock-Cedar (Type 6) forests on ridges and lowland Cedar-Ash-Alder-Maple woods (Type 9) in the swales. The forest vegetation in the woods is in excellent condition and supports a rich array of regionally important flora. The most significant of these include the largest Simcoe County stands of Calypso (Calypso bulbosa), large stands of Ram's-head Orchid (Cypripedium arietinum), the gentian Halenia deflexa and various sedges, including Carex capillaris.

This upland intolerant raised-beach forest vegetation is greatly under-represented in Site District 6-6 and Oakview Woods appears to be the best example extant.

It is recommended that the area of Oakview Woods north of Mosley Street be designated as a nature reserve zone within Wasaga Beach Park and that no further encroachment of development into the edges of the forested area be permitted.

DATA SHEETS ATTACHED

PHYSICAL DESCRIPTION ☐
VEGETATION SUMMARY ☐
EVALUATION SHEET ☐
COMMUNITY DESCRS. ☐
COMMUNITY COMP. LISTS ☐
SUMMARY SPECIES LISTS ☐
PHYSICAL FEATURES MAP ☐
VEGETATION MAP ☐
BIBLIOGRAPHY ☐
PHOTOGRAPHS ☐

MAJOR INFORMATION SOURCES
D.F. Brunton. 1989. Biological Inventory and Evaluation of Wasaga Beach Prov. Park and Adjacent Natural Areas, Simcoe County, Ontario Parks & Rec. Areas Sections, Richmond Hill.

EVALUATION AND PRIORITIES
Provincially significant raised beach Cedar-Hemlock forest & swale complex

DATE COMPILED	COMPILER
March 1989	Daniel F. Brunton

Ontario Ministry of Natural Resources, Parks and Recreational Areas Programme, Queen's Park, Toronto, Ontario M7A 1W3

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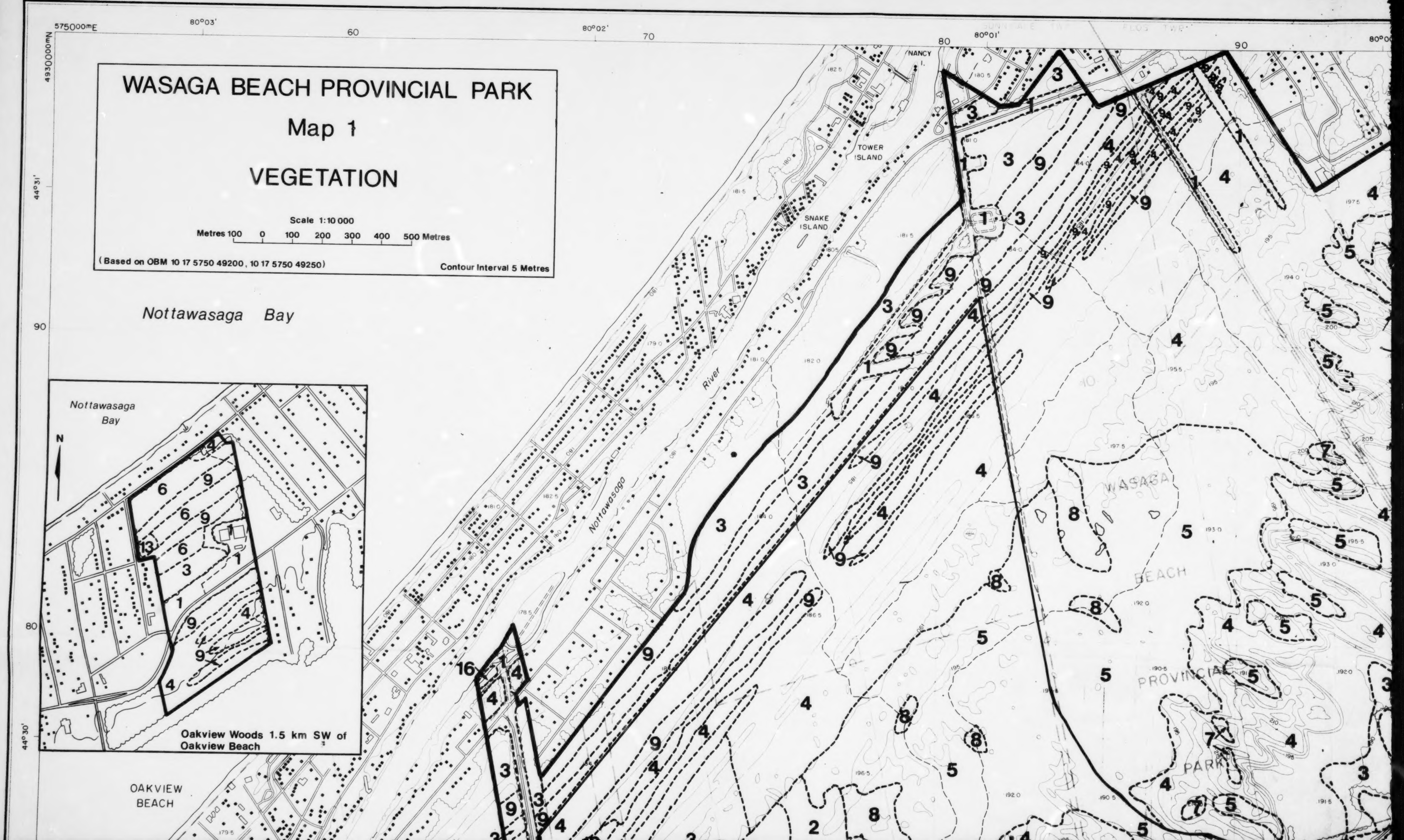


WASAGA BEACH PROVINCIAL PARK

Map 1

VEGETATION

Scale 1:10 000

Metres 100 0 100 200 300 400 500 Metres

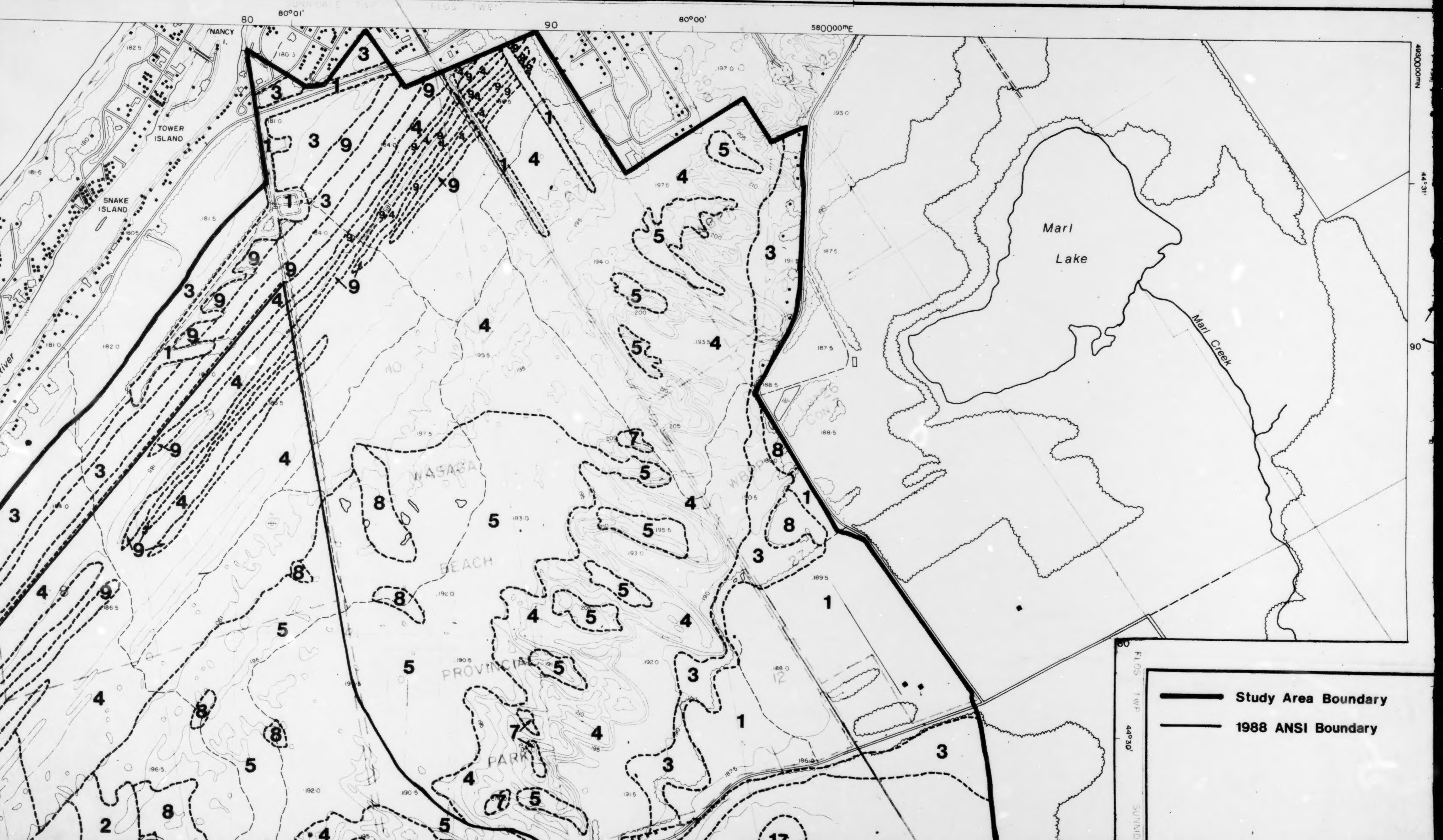
(Based on OBM 10 17 5750 49200, 10 17 5750 49250)

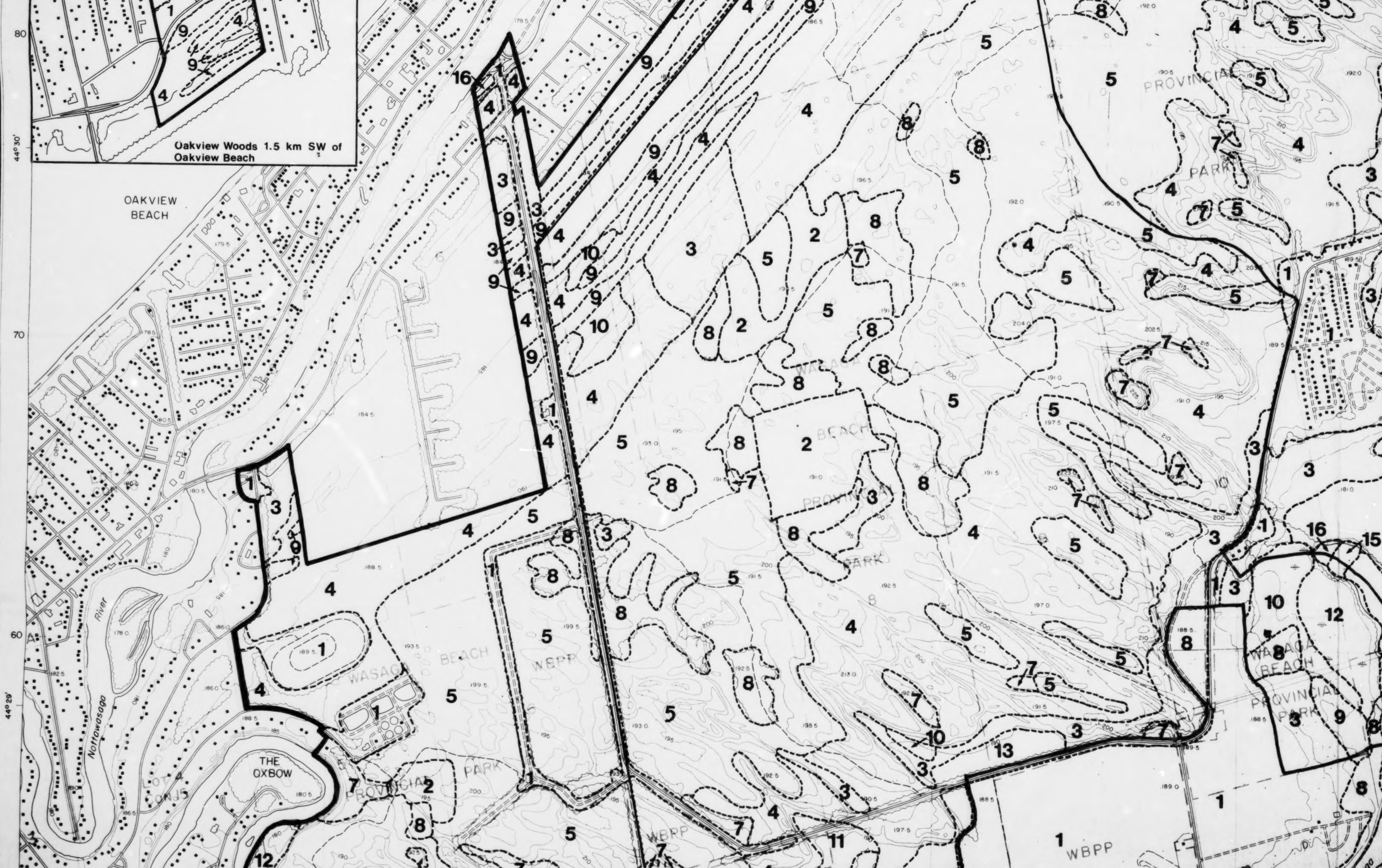
Contour Interval 5 Metres

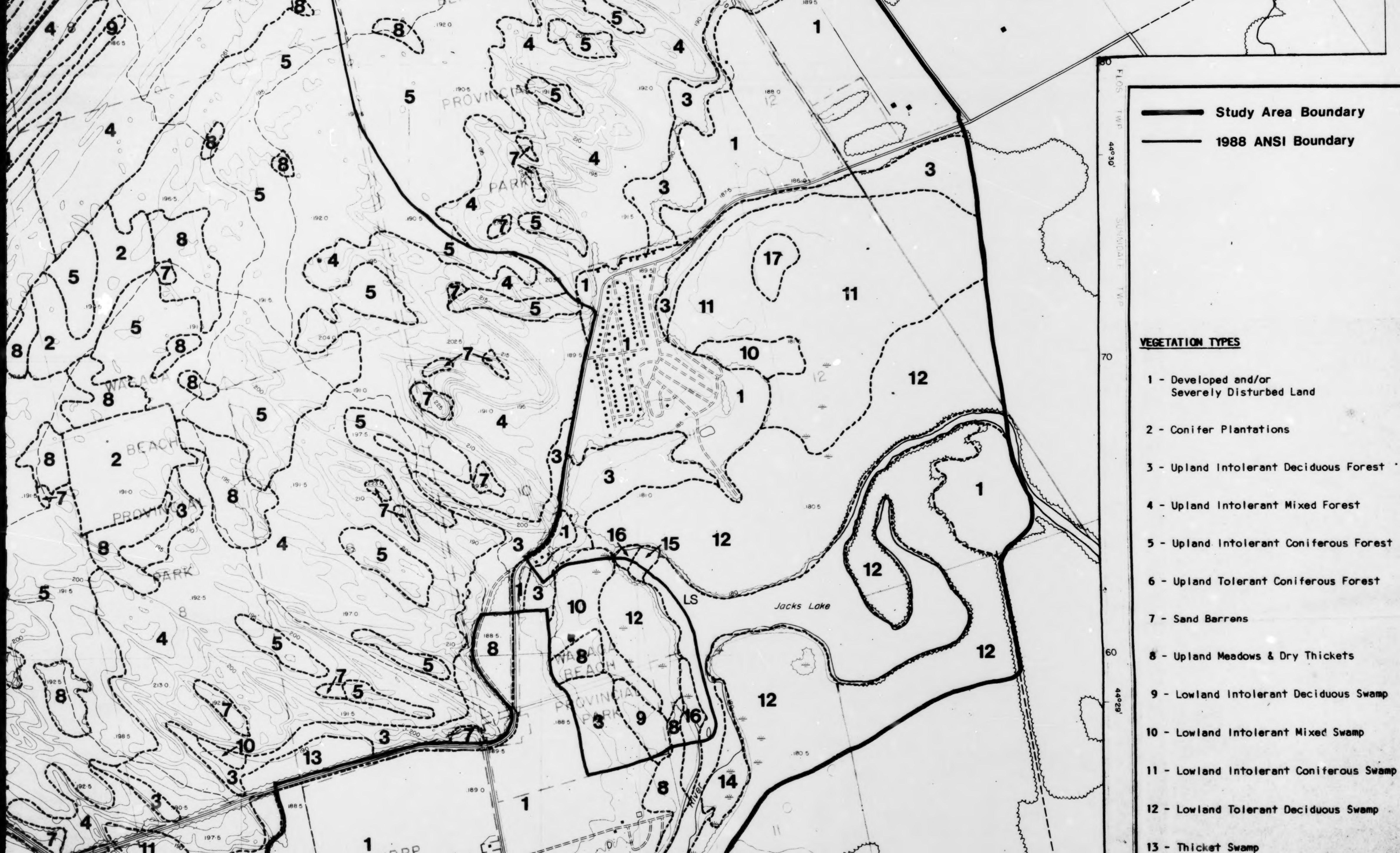
Oakview Woods 1.5 km SW of Oakview Beach

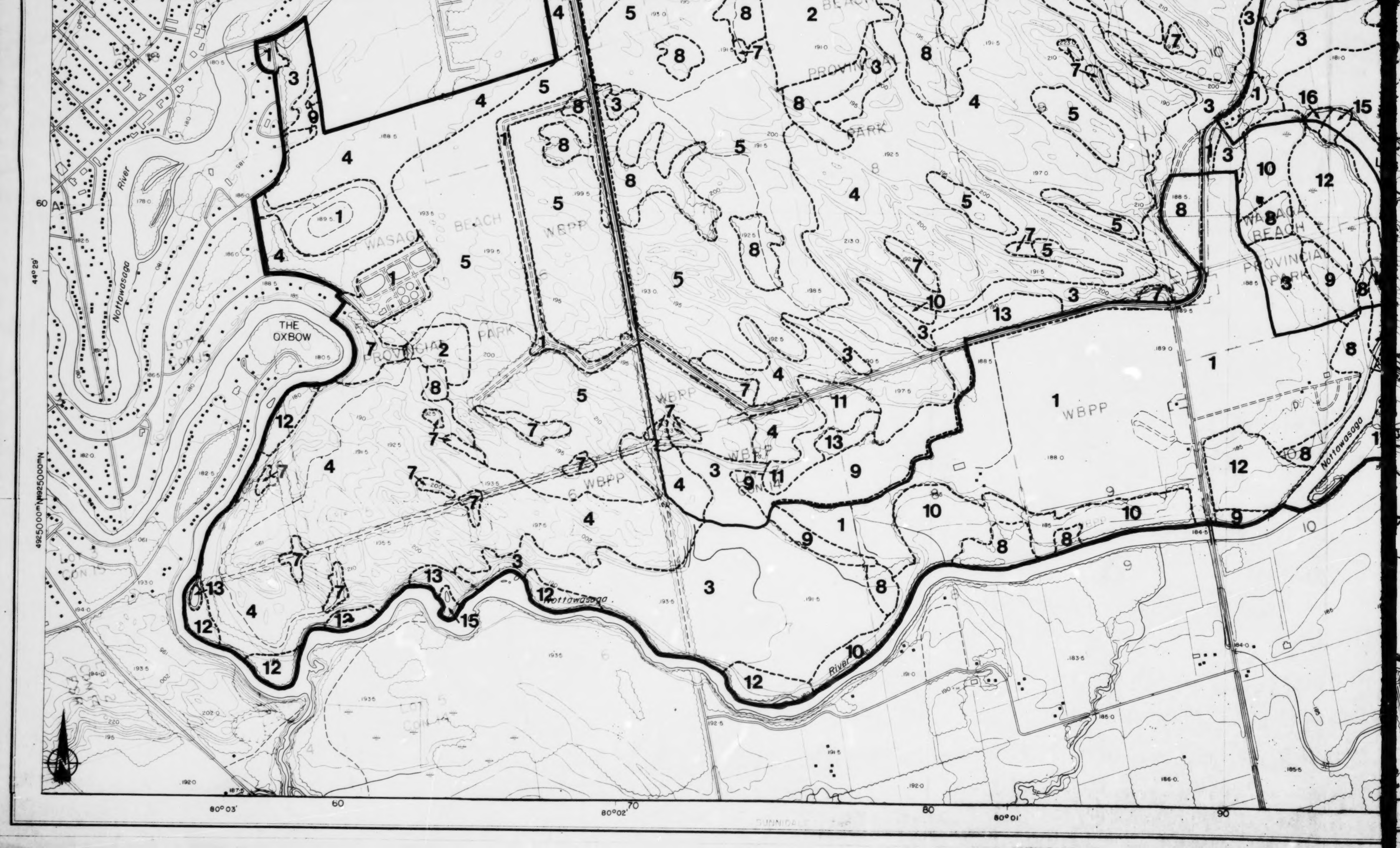
575000mE
80°03'
60
80°02'
70
80
80°01'
90
4930000mN
44°31'
90
80
44°30'
Nottawasaga Bay
Nottawasaga River
NANCY I.
TOWER ISLAND
SNAKE ISLAND
OAKVIEW BEACH
WASAGA BEACH PROVINCIAL PARK
SUNNIDALE TWP
FLOS TWP
N
1
2
3
4
5
6
7
8
9
16

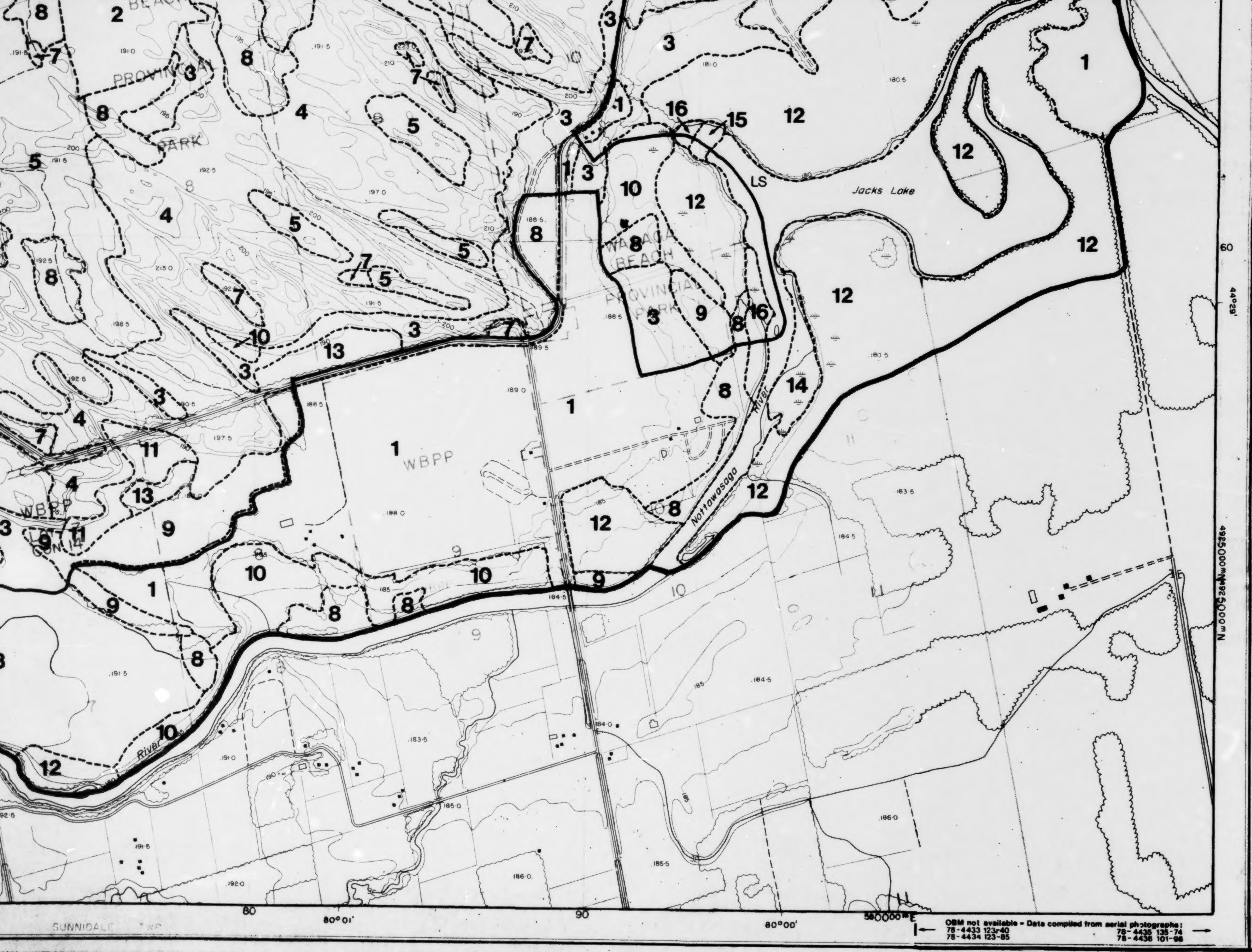
10175750


SUNNIDALE TWP
FLOS TWP
80
80°01'
90
80°00'
580000mE
4930000mN
44°31'
44°30'
NANCY I.
TOWER ISLAND
SNAKE ISLAND
River
Marl Lake
Marl Creek
WASAGA BEACH PROVINCIAL PARK
FLOS TWP
SUNNIDALE
Study Area Boundary
1988 ANSI Boundary


Oakview Woods 1.5 km SW of Oakview Beach
OAKVIEW BEACH
WASAGA BEACH PROVINCIAL PARK
WBPP
THE OXBOW
Nottawasaga River
LOT 4 CON 15
44°30'
44°29'
80
70
60


Study Area Boundary
1988 ANSI Boundary
VEGETATION TYPES
1 - Developed and/or Severely Disturbed Land
2 - Conifer Plantations
3 - Upland Intolerant Deciduous Forest
4 - Upland Intolerant Mixed Forest
5 - Upland Intolerant Coniferous Forest
6 - Upland Tolerant Coniferous Forest
7 - Sand Barrens
8 - Upland Meadows & Dry Thickets
9 - Lowland Intolerant Deciduous Swamp
10 - Lowland Intolerant Mixed Swamp
11 - Lowland Intolerant Coniferous Swamp
12 - Lowland Tolerant Deciduous Swamp
13 - Thicket Swamp
PROVINCIAL PARK
WASAGA BEACH PROVINCIAL PARK
WASAGA BEACH PROVINCIAL PARK
Jacks Lake
River
LS
FLOS TWP
SUNNIDALE TWP
44°30'
44°29'
80
70
60


THE OXBOW
WASAGA BEACH
PROVINCIAL PARK
WASAGA BEACH PROVINCIAL PARK
WBPP
Nottawasaga River
Nottawasaga
River
LOT 4 CON 15
LOT 3 CON 15
LOT 2 CON 14
LOT 5 CON 14
CON 14
44°29'
60
4925000mN
80°03'
80°02'
80°01'
60
70
80
90
SUNNIDALE


WASAGA BEACH PROVINCIAL PARK
PROVINCIAL PARK
WBPP
Jacks Lake
LS
Nottawasaga River
River
CON 14
SUNNIDALE TWP
60
44°29'
4925000m N
80
80°01'
90
80°00'
580000m E

OBM not available - Data compiled from aerial photographs:
78-4433 123-40
78-4434 123-85
78-4435 135-74
78-4436 101-96

2 - Conifer Plantations

3 - Upland Intolerant Deciduous Forest

4 - Upland Intolerant Mixed Forest

5 - Upland Intolerant Coniferous Forest

6 - Upland Tolerant Coniferous Forest

7 - Sand Barrens

8 - Upland Meadows & Dry Thickets

9 - Lowland Intolerant Deciduous Swamp

10 - Lowland Intolerant Mixed Swamp

11 - Lowland Intolerant Coniferous Swamp

12 - Lowland Tolerant Deciduous Swamp

13 - Thicket Swamp

14 - Wet Meadows

15 - Mixed Marsh

16 - Shallow Marsh

17 - Graminoid Fen

Ministry of
Natural
Resources
Ontario

Map 1: Brunton, D. 1989
Biological Inventory and Evaluation of
Wasaga Beach Provincial Park and
Adjacent Natural Areas, Simcoe County, Ontario
Parks and Recreational Areas Section, OMNR
Central Region, Richmond Hill
Cartography by M. McLean, OMNR
Based on draft maps prepared by D. Brunton
May 1989

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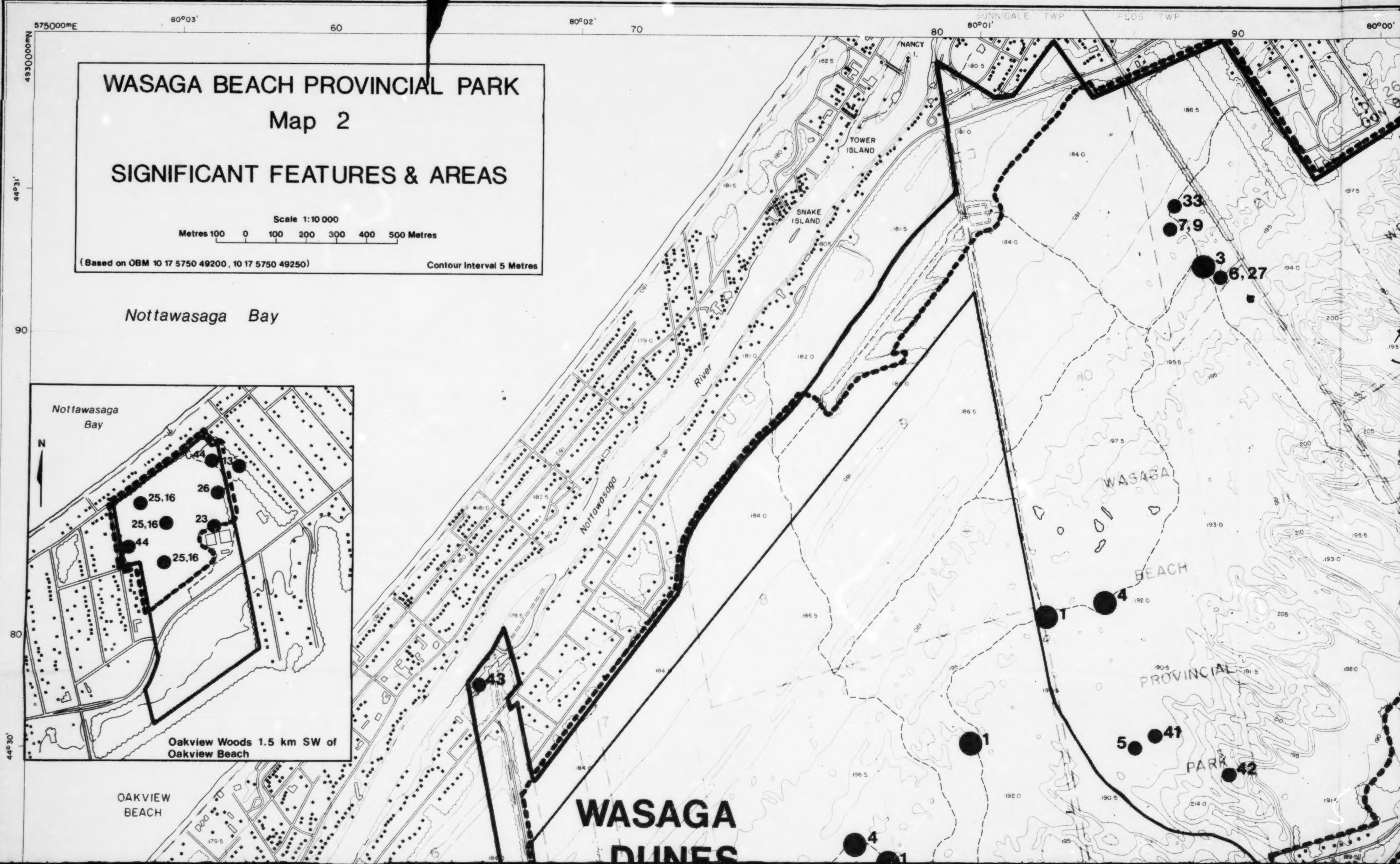


WASAGA BEACH PROVINCIAL PARK
Map 2
SIGNIFICANT FEATURES & AREAS

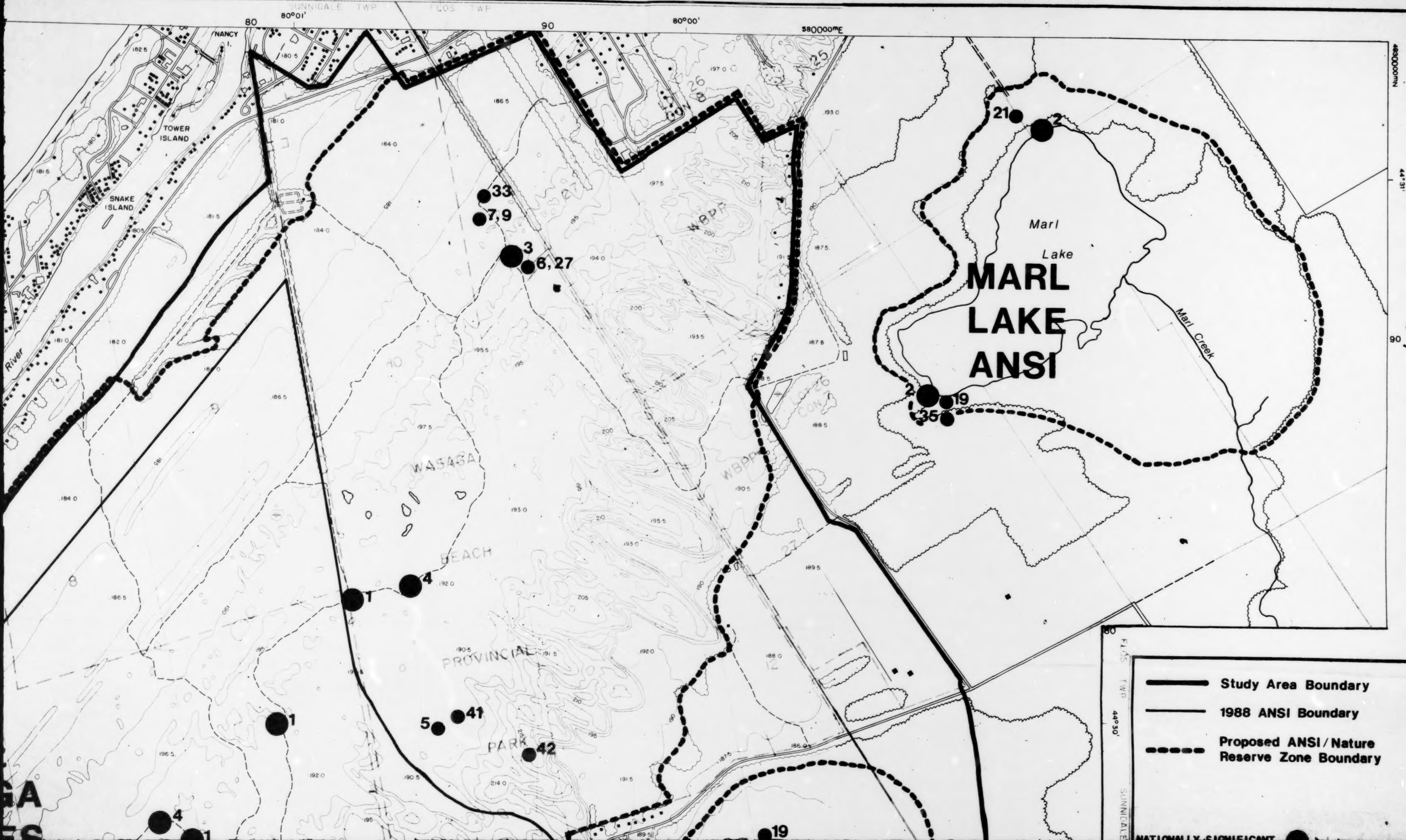
Scale 1:10 000
Metres 100 0 100 200 300 400 500 Metres

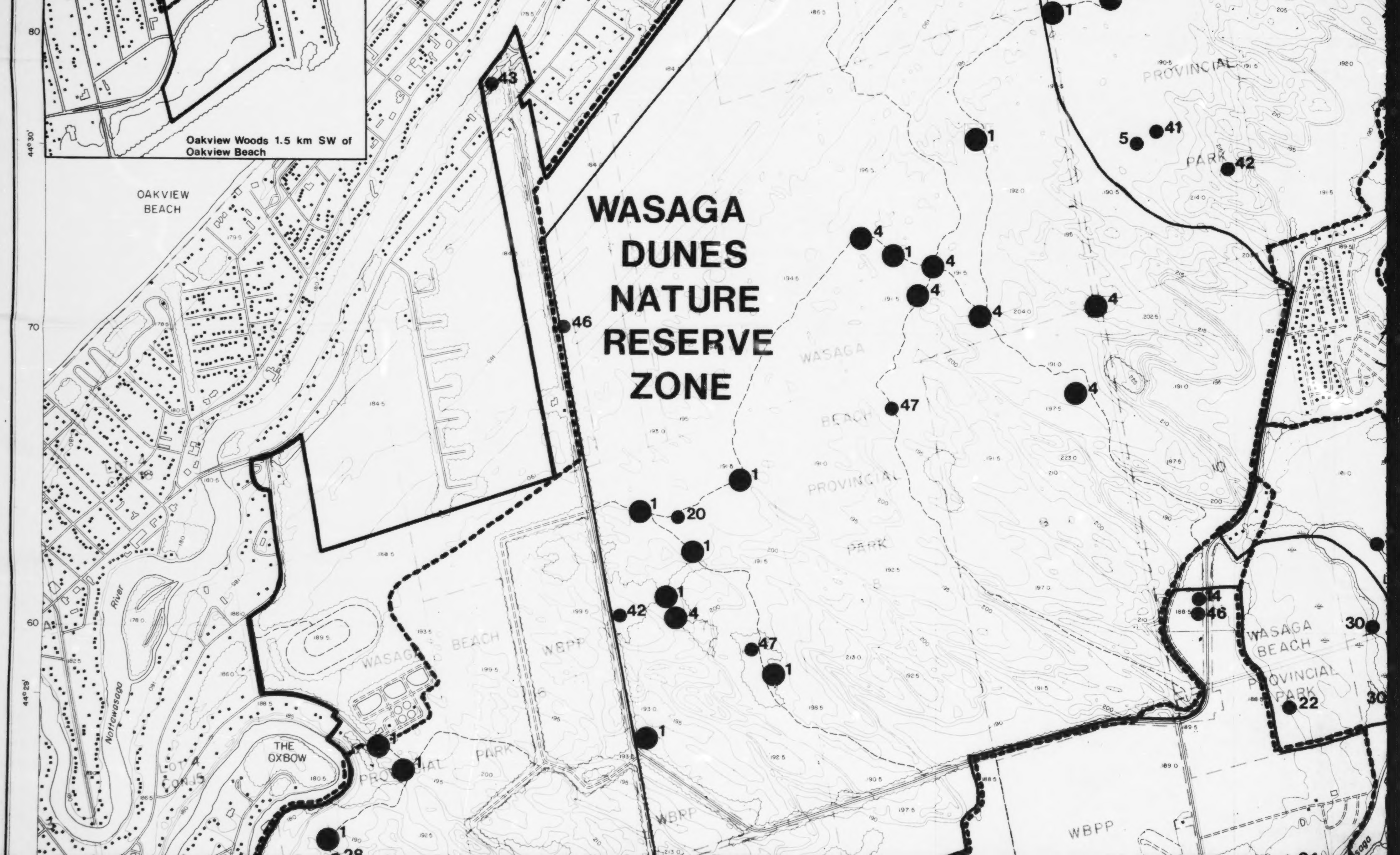
(Based on OBM 10 17 5750 49200, 10 17 5750 49250)

Contour Interval 5 Metres

Oakview Woods 1.5 km SW of Oakview Beach

575000mE
4930000mN
80°03'
60
80°02'
70
80
80°01'
90
80°00'
44°31'
44°30'
90
80
SUNNIDALE TWP
FLOS TWP
Nottawasaga Bay
Nottawasaga River
NANCY I.
TOWER ISLAND
SNAKE ISLAND
WASAGA BEACH PROVINCIAL PARK
WASAGA DUNES
OAKVIEW BEACH
N
33
7,9
3
6, 27
4
1
1
5
41
42
43
4
44
13
26
25,16
25,16
23
44
25,16


SUNNIDALE TWP
FLOS TWP
80
80°01'
90
80°00'
580000mE
NANCY I.
TOWER ISLAND
SNAKE ISLAND
River
MARL LAKE ANSI
Marl Lake
Marl Creek
WASAGA BEACH PROVINCIAL PARK
WBPP
33
7,9
3
6, 27
21
2
19
35
1
4
5
41
42
GA
44°30'
44°31'
90
Study Area Boundary
1988 ANSI Boundary
Proposed ANSI / Nature Reserve Zone Boundary
NATIONALLY SIGNIFICANT


Oakview Woods 1.5 km SW of Oakview Beach
WASAGA DUNES NATURE RESERVE ZONE
OAKVIEW BEACH
WASAGA BEACH PROVINCIAL PARK
PROVINCIAL PARK
WBPP
WBPP
WBPP
THE OXBOW
LOT 4 CON.15
Nottawasaga River
80
70
60
44°30'
44°29'
1
4
5
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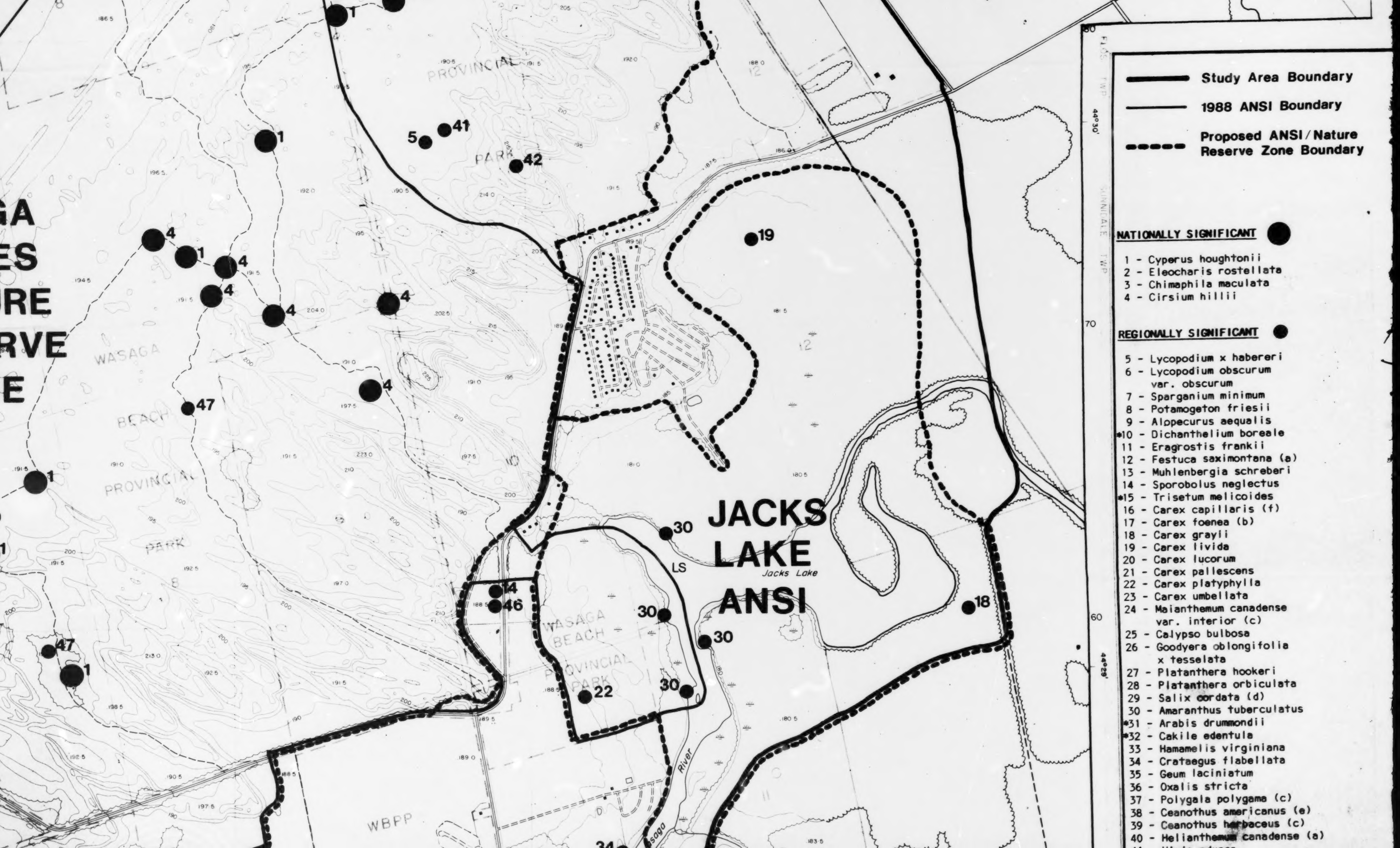
20
22
28
30
41
42
43
46
47


Study Area Boundary
1988 ANSI Boundary
Proposed ANSI/Nature Reserve Zone Boundary
NATIONALLY SIGNIFICANT ●
1 - Cyperus houghtonii
2 - Eleocharis rostellata
3 - Chimaphila maculata
4 - Cirsium hillii
REGIONALLY SIGNIFICANT ●
5 - Lycopodium x habereri
6 - Lycopodium obscurum var. obscurum
7 - Sparganium minimum
8 - Potamogeton friesii
9 - Alopecurus aequalis
*10 - Dichanthelium boreale
11 - Eragrostis frankii
12 - Festuca saximontana (a)
13 - Muhlenbergia schreberi
14 - Sporobolus neglectus
*15 - Trisetum melicoides
16 - Carex capillaris (f)
17 - Carex foenea (b)
18 - Carex grayii
19 - Carex livida
20 - Carex lucorum
21 - Carex pallescens
22 - Carex platyphylla
23 - Carex umbellata
24 - Maianthemum canadense var. interior (c)
25 - Calypso bulbosa
26 - Goodyera oblongifolia x tesselata
27 - Platanthera hookeri
28 - Platanthera orbiculata
29 - Salix cordata (d)
30 - Amaranthus tuberculatus
*31 - Arabis drummondii
*32 - Cakile edentula
33 - Hamamelis virginiana
34 - Crataegus flabellata
35 - Geum laciniatum
36 - Oxalis stricta
37 - Polygala polygama (c)
38 - Ceanothus americanus (e)
39 - Ceanothus herbaceus (c)
40 - Helianthemum canadense (a)
JACKS LAKE ANSI
Jacks Lake
GA
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URE
RVE
E
WASAGA BEACH PROVINCIAL PARK
PROVINCIAL PARK
WBPP
LS
Wasaga River
FLOS TWP
SUNNIDALE TWP
44°30'
44°29'
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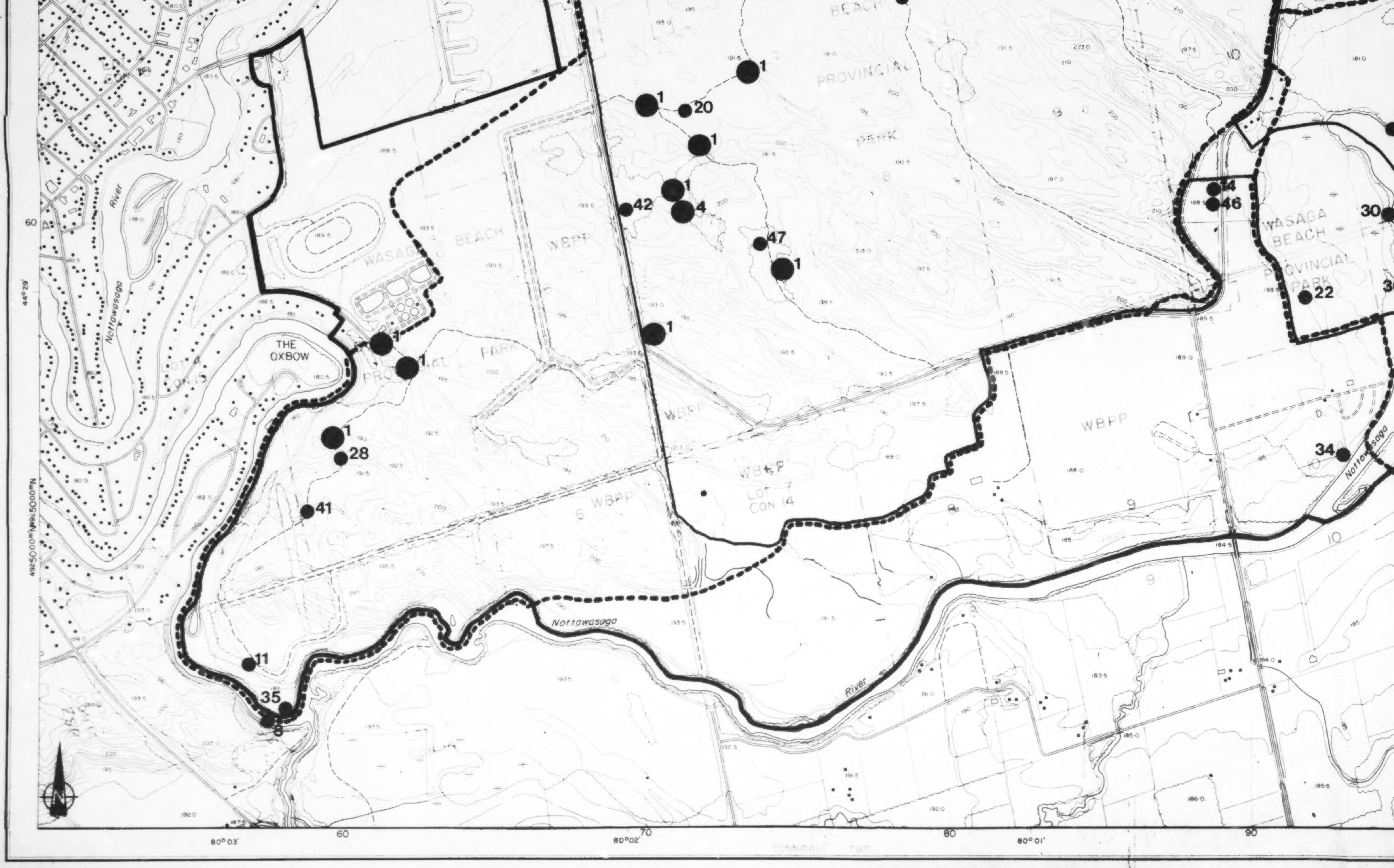
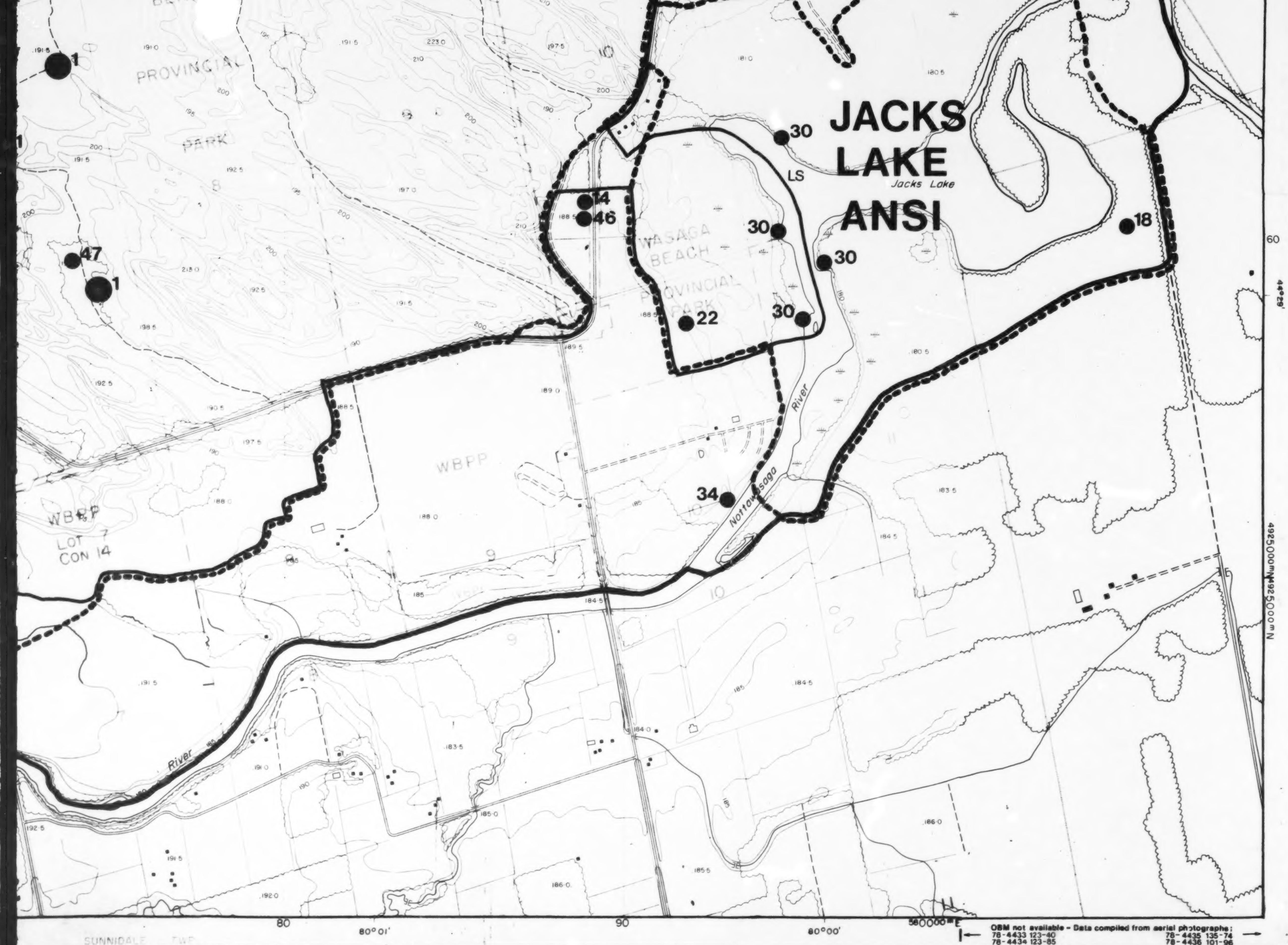
70
60


WASAGA BEACH PROVINCIAL PARK
WASAGA BEACH PROVINCIAL PARK
WASAGA BEACH PROVINCIAL PARK
WASAGA BEACH PROVINCIAL PARK
WBPP
WBPP
WBPP
WBPP
WBPP
THE OXBOW
LOT 4 CON 15
LOT 7 CON 14
Nottawasaga River
Nottawasaga River
Nottawasaga
1
20
1
1
4
42
47
1
1
1
1
1
28
41
11
35
8
14
46
30
22
34
60
44°29'
4925000mN
80°03'
60
80°02'
70
80
80°01'
90
SUNNIDALE TWP


JACKS LAKE ANSI
Jacks Lake
LS
WASAGA BEACH PROVINCIAL PARK
PROVINCIAL PARK
WBPP
LOT 7 CON 14
Nottawasaga River
River
1
47
14
46
22
30
34
18
80
90
80°01'
80°00'
560000mE
4925000mN
44°29'
60
SUNNIDALE TWP

OBM not available - Data compiled from aerial photographs;
78-4433 123-40
78-4434 123-85
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78-4436 101-96

8 - Potamogeton friesii
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22 - Carex platyphylla
23 - Carex umbellata
24 - Maianthemum canadense
var. interior (c)
25 - Calypso bulbosa
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x tesselata
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28 - Platanthera orbiculata
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36 - Oxalis stricta
37 - Polygala polygama (c)
38 - Ceanothus americanus (e)
39 - Ceanothus herbaceus (c)
40 - Helianthemum canadense (a)
41 - Viola adunca
42 - Oenothera oakesiana
43 - Hippurus vulgaris
44 - Halenia deflexa
45 - Asclepias tuberosa (a)
46 - Agalinis tenuifolia
47 - Hieracium gronovii

(a) throughout Vegetation Types 7 & 8
(b) throughout Vegetation Types 4 & 7
(c) throughout Vegetation Types 4 & 5
(d) throughout Vegetation Type 7 (on beac
(e) throughout Vegetation Type 8
(f) throughout Vegetation Type 6

* Not Mapped

Map 2: Brunton, D. 19
Biological Inventory and Evaluation
Wasaga Beach Provincial Park a
Adjacent Natural Areas, Simcoe County, Ontar
Parks and Recreational Areas Section, O
Central Region, Richmond Hi
Cartography by M. McLean,
Based on draft maps prepared by D. Brunt
May 19

Ministry of Natural Resources
Ontario